The Market for College Graduates In South Carolina

by

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Executive Summary

Over the past two decades, technological change and increased international trade have reduced the demand for less-skilled labor and increased the demand for highly skilled labor in the United States. As a result, larger numbers of students are pursuing education beyond the secondary level. Although the supply of college graduates rose in the nation between 1980 and 1990, shifts in demand have apparently outpaced shifts in supply: the wage premiums earned by two- and four-year college graduates rose.

As in the nation, higher education in South Carolina has expanded markedly. This expansion has not been unproblematic, for along with the expansion of higher education in the U.S. has been a considerable increase in costs. This raises the question of whether higher education is a good investment, especially in a state such as South Carolina, which lacks major urban areas or research parks. This report analyzes the market for college graduates in South Carolina. The questions addressed include:

♦ What proportion of the population in South Carolina has a two- or four-year college degree, and how have these fractions changed since 1980? What role has migration played in these changes?

♦ How large are the returns to a two-year and four-year college degree? How do the returns in South Carolina compare with those elsewhere?

♦ Are college graduates being channeled into occupations where these degrees are most valuable?

To address these questions, I use data from the 1980 and 1990 censuses of population. I make extensive comparisons with North Carolina, Georgia, and the U.S. as a whole. This executive summary provides a brief overview of the findings.

1. About 18 percent of workers in South Carolina had at least a four-year college degree in 1990, compared with 14.1 percent in 1980. Even so, South Carolina lost ground relative to the U.S.: the fraction with a four-year degree or better fell from 81 percent of the U.S. level to 78.6 percent. North Carolina's college-educated workforce kept pace with the U.S., rising from 14.8 percent in 1980 (85 percent of the U.S. level) to 19.7 percent in 1990 (86 percent of the U.S. level). Georgia's college-educated workforce rose from 14.8 percent in 1980 (90.2 percent of the U.S. level) to 20.8 percent in 1990 (90.9 percent of the U.S. level).

2. Migration into South Carolina raised the average level of education markedly, as it did in North Carolina and Georgia. Although many four-year college graduates born in South Carolina had left the state by 1990, this outflow was (slightly) more than offset by the flow of college graduates into the state. The net inflow of college graduates was rather higher in North Carolina and

Georgia, probably attracted by North Carolina's Research Triangle and Atlanta's remarkable growth.

3. The median four-year college graduate in the Carolinas earned 60-65 percent more than the median high school graduate. Young South Carolinian workers with a four-year college degree earned about $10, and older workers about $14 per hour, in 1990. The figures for North Carolina were similar. The figures for Georgia were $11 and $15, and $11 and $14 per hour for the U.S. as a whole.

4. The median two-year college graduate in South Carolina earned 29- 33 percent more than the median high school graduate. Younger two-year college graduates earned about $8.33 per hour, and older two-year college graduates about $10.87. These figures were relatively close to those in North Carolina ($8.27 and $10.58), Georgia ($8.85 and $12.02), and the U.S. as a whole ($8.59 and $11.54).

5. Between 1980 and 1990, the wage premium of a four-year college degree relative to a high school degree rose in South Carolina from 38.6 to 45.7 percent. However, the wage premium was considerably higher in North Carolina, Georgia, and the U.S. as a whole. The four-year college/high-school wage premium rose from 41.2 to 48.8 percent in North Carolina, from 37.5 to 50.8 percent in Georgia, and from 35.6 to 50.9 percent in the U.S. as a whole over the same period.

6. The wage premium of a two-year college degree relative to a high school degree in South Carolina was 24.7 percent, compared with 24.1 percent in North Carolina, 27.6 percent in Georgia, and 25.5 percent in the U.S. as a whole.

7. Figure 1 shows how weekly earnings for a typical South Carolinian white married male varies with age. The four curves show how earnings evolve among each of four schooling groups: high school dropouts, high school graduates, two-year college graduates, and four-year college graduates. In all four groups, earnings rise with age at a decreasing rate, and eventually decline. At young ages, schooling has a relatively small effect on earnings: the curves are relatively close together. However, as individuals age, the effect of schooling quickly increases, especially for four-year college graduates.

8. Table 1 contains estimates of the financial rate of return to a college degree in South Carolina, North Carolina, Georgia, and the U.S. as a whole. The financial rate of return to a four-year college degree relative to a high school degree was about 10.8 percent for whites in South Carolina. The rate of return was even higher for blacks, at 11.6 percent. These returns compare favor-

ably with the returns on government bonds and stocks, and are considerably less risky than that on stocks.

9. The financial rate of return to a two-year college degree relative to a high school degree in South Carolina was about 10.1 percent. Although about 0.7 percentage points lower than the rate of return to a four-year degree, it compares very favorably with the returns on alternative investments. Again, the return for black students was even higher, at 10.6 percent.

10. The financial return to a four-year college degree relative to a two-year degree in South Carolina was 11.2 percent for whites and 12.3 percent for blacks. Interestingly, this return is higher than the return to a two-year college degree.

Figure 1: Age-Earnings Profiles by Education Level: South Carolina, 1990

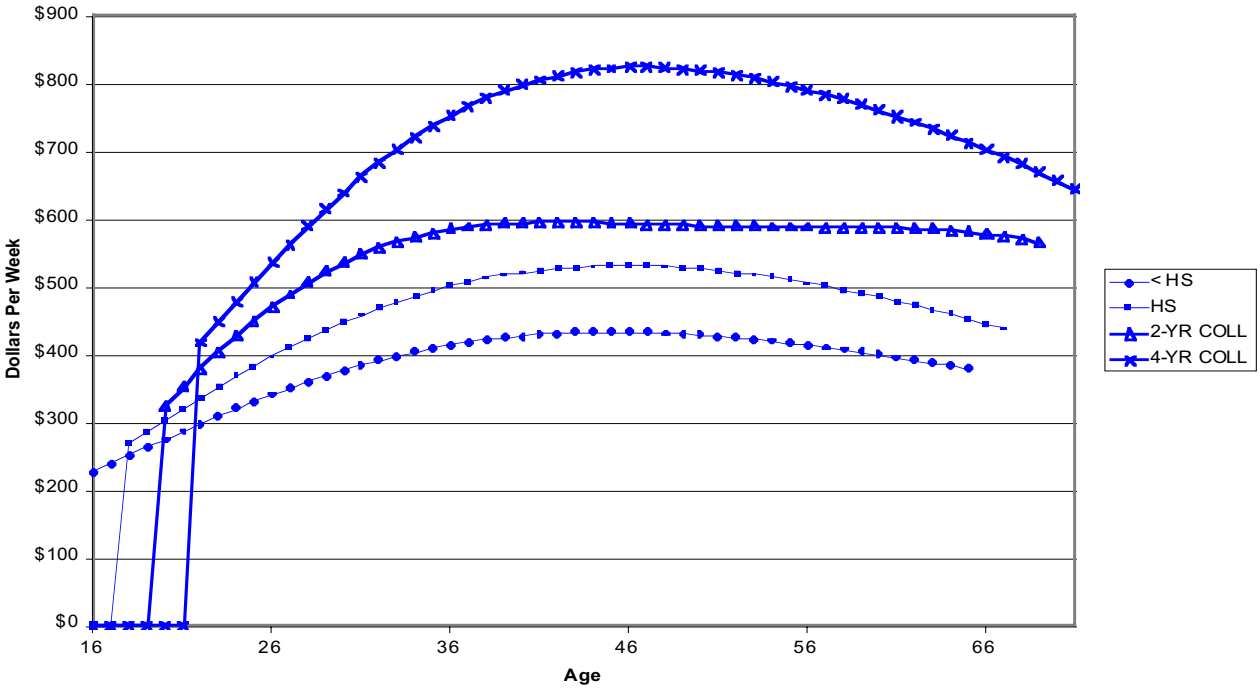


Table 1: Estimated Internal Rates of Return to College Degree

A. Private Rates of Return

	Two-Year College Relative to HS Degree	Four-Year College Relative to HS Degree	Four Year College Relative to Two-Year College
1. Whites			
South Carolina	10.1%	10.8%	11.2%
North Carolina	11.3%	12.4%	13.4%
Georgia	11.4%	12.5%	13.5%
U.S.	10.8%	12.3%	13.5%
2. Blacks			
South Carolina	10.6%	11.6%	12.3%
North Carolina	10.4%	12.3%	13.9%
Georgia	11.3%	12.8%	14.2%
U.S.	13.5%	12.7%	12.0%

B. Private Rates of Return For Recipients of LIFE and HOPE Scholarships

1. Whites			
South Carolina LIFE Scholarship	10.5%	11.5%	12.1%
Georgia HOPE Scholarship	11.9%	13.4%	15.0%
2. Blacks			
South Carolina LIFE Scholarship	11.1%	12.4%	13.4%
Georgia HOPE Scholarship	11.9%	13.9%	16.0%

C. Social (Inclusive of State Share of Costs) Rates of Return: South Carolina Only

Whites	9.0%	9.4%	9.9%
Blacks	9.2%	10.0%	10.4%

Source: Calculations of the author.

11. South Carolina's recently established LIFE scholarship pays students who qualify up to $1,000 for tuition in two-year colleges, and up to $2,000 per year for tuition in four-year colleges. The reduction in students' out-of-pocket cost raises the financial return to a four-year degree from 10.8 to 11.5 percent, and raises the return to a two-year degree from 10.1 to 10.5 percent.

12. The rate of return to a four-year degree was lower in South Carolina (10.8%) than in North Carolina (12.4%), Georgia (12.5%), or the U.S. as a whole (12.3%). The same was true for a two-year degree (SC, 10.1%; NC, 11.3%; GA, 11.4%; US, 10.8%).

13. South Carolina employs fewer four-year college graduates per worker than North Carolina or the U.S. as a whole within an industry.

14. Even within an occupation, South Carolina employs relatively fewer college graduates than either North Carolina or the U.S. as a whole.

15. Four-year college graduates in South Carolina tend to be employed in occupations that offer higher rates of return, but not two-year college graduates. This suggests that greater emphasis may need to be devoted to providing both employers and employees with better information.

Several findings stand out. First, although four-year college tuition is about twice that at two-year colleges, the financial return to a four-year degree in South Carolina is 0.7 percentage points higher (0.5 points higher adjusting for the state's share of costs). Second, the returns to college are higher for blacks than for whites in South Carolina. Third, the financial return to a four-year degree relative to a two-year degree is 2.1 percentage points higher than the return to a 2-year degree relative to high school. Finally, the returns to college are somewhat lower in South Carolina than in North Carolina, Georgia, or the U.S. as a whole. One potential explanation is the lack of a major city or research centers, but further research is clearly necessary before firm conclusions can be drawn.

I. Introduction

Education was among the most important issues facing U.S. voters in 1998. South Carolina was no exception. It is not surprising that a key issue responsible for Jim Hodges's gubernatorial victory was his expressed commitment to education. South Carolina's students continue to score at or near the bottom on virtually all standardized tests. Despite marked increases in the high school graduation rate between 1970 and 1990, the dropout rate in South Carolina remains among the highest in the country. However, one might note that South Carolina has enjoyed a nearly unbroken spell of economic growth over the past two decades, despite the fact that its education has lagged behind that of the rest of the nation. Why, then, the concern about college education?

For two decades, the forces of technological change and international trade have caused the demand for less-skilled labor to fall, and the demand for highly skilled labor to rise. These forces have, in politicized terms, caused "the rich to become richer and the poor to become poorer." More precisely, these forces have increased the earnings of individuals with high levels of skill – especially individuals with a college degree – and reduced the earnings of less-educated individuals – especially high school dropouts. Despite these trends, some South Carolinians might question the value of a college degree. Because education in South Carolina has lagged behind the rest of the country, jobs in the state tended to employ individuals with lower levels of schooling.

Between 1970 and 1980, much of South Carolina's economic development relied on the relocation and startup of manufacturing firms. However, according to data from the Department of Labor, manufacturing employment declined by 2.2 percent in South Carolina between 1980 and 1990, compared with a 6 percent decline nationwide. Nor has this trend reversed: between 1990 and 1997, manufacturing employment fell by 5.4 percent in South Carolina, compared with a 2.2 percent decline nationwide.

These trends suggest that sectors that have provided growth in the past may not do so in the future. Nor is it clear that two other areas of emphasis — the development of tourism and retirement communities, sectors that use less skilled labor intensively — can provide continued increases in the standard of living to which South Carolinians have become accustomed. In the future, South Carolina's fortunes may hinge on developing higher levels of skill in the workforce.

In this report, I examine the market for two-year (which includes technical) and four-year college graduates in the South Carolina in detail. The report is organized around the following three questions.

1. What proportion of South Carolinians has a two- or four-year college degree, and how have these fractions changed since 1980? What role has migration played in these changes?

2. How large are the returns to a two-year and four-year college degree? How do the returns in South Carolina compare with those elsewhere? How has the wage premium associated with a college degree changed over time?

3. Are college graduates being channeled into occupations where these degrees are most valuable?

The paper is organized as follows. Section II begins with an overview of education levels in South Carolina in 1990. Extensive comparisons are made with 1980, as well as with North Carolina, Georgia, and the nation. Inflows and outflows of four-year college graduates are studied particularly closely. Section III analyzes the earnings of college graduates and compares them with the earnings of other education groups. Section IV presents a cost-benefit analysis of college education, and in Section V I calculate financial rates of return to the two- and four-year college degree. Section VI analyzes the question of whether too many college graduates work in jobs that do not reward their degree. Section VII summarizes the findings and makes some suggestions for future research. The Appendix that follows the paper contains an extensive analysis of the distribution of college graduates, both two-year and four-year, across industries.

II. Overview

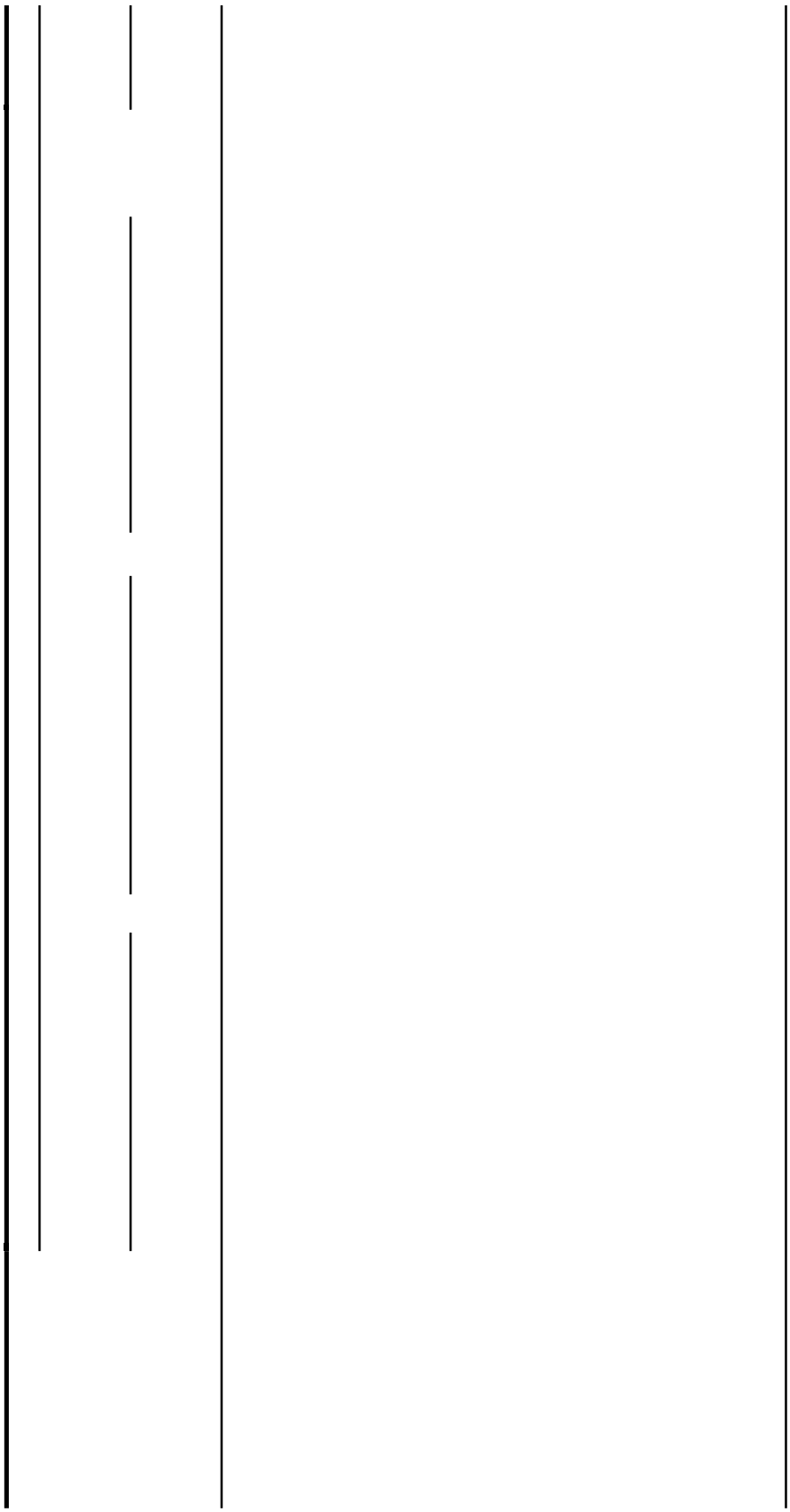
A. Education Levels in the Carolinas and Georgia

Table II.A.1 shows the education distribution for individuals between the ages of 25 and 55 in the Carolinas, Georgia, and the U.S. as a whole, in 1980 and 1990.[1] The data for 1990 indicate similar education levels within the Carolinas and Georgia, but lower levels than in the nation. For example, 17.5 percent of individuals in the U.S. had less than a high school degree, compared with 21- 24 percent in the Carolinas and Georgia. About 23 percent of individuals in the U.S. had a four-year college degree or better, compared with 18 percent in South Carolina, 19.7 percent in North Carolina, and 20.8 percent in Georgia. About 7.8 percent of South Carolinians had a two-year college degree, compared with 8.4 percent in North Carolina, 5.8 percent in Georgia, and 7.6 percent in the nation as a whole.

Part B of **Table II.A.1** shows that about 33 percent of South Carolinians were high school dropouts in 1980, nearly 50 percent more than the U.S. average of 22.3 percent. The percentage of dropouts declined in South Carolina to 24 percent by 1990, still 37 percent higher than the national average of 17.5 percent. Similar declines in the share of high school dropouts occurred in North Carolina and Georgia.

Although a slightly smaller share of South Carolinians had a four-year college degree in 1990 than in 1980 (12.8 versus 12.1 percent), far more had advanced degrees (5.9 versus 1.3 percent). As a result, the fraction of South Carolinians with a four-year college degree or better rose from 14.1 percent in 1980 to 18 percent in 1990. However, relative to the U.S., South Carolina lost ground: the share of four-year college graduates or better fell from 81 percent of the national average in 1980 to 79 percent in 1990. By comparison, the fraction with a four-year college degree or better rose in North Carolina from 14.8 to 19.7 percent, or from 85 to 86 percent of the national average. The figures for Georgia were 15.7 percent in 1980 (90 percent of the national average) and 20.8 percent in 1990 (about 91 percent of the national average).

[1] The state-level data were drawn from the 5 percent samples of the Public Use Micro Samples (PUMS) of the 1990 census. Data for the U.S. as a whole were drawn from the 1 percent A sample of the PUMS.



B. In-Migrants Are Better Educated than Natives

In-migrants had much higher levels of education than did natives, which raised the state averages significantly. For example, about 13 percent of in-migrants into the Carolinas and Georgia had less than a high school degree in 1990, compared with 29 percent of natives in South Carolina and Georgia, and 25 percent in North Carolina. About 28 percent of in-migrants into South Carolina, and 31 percent in North Carolina and Georgia, had a college degree or better, compared with 13 percent of South Carolina and Georgia natives, and 14.2 percent of North Carolina natives.

The higher average level of education among in-migrants is not unexpected. Better-educated individuals tend to be more mobile, for several reasons. First, the returns to migration tend to be higher for better-educated individuals. Second, better-educated individuals are better informed about labor market opportunities elsewhere in the country.

Two things should be borne in mind. First, these data are for individuals of working ages – ages 25-55 – so that they do not reflect the effects of retirees moving into the region. Second, although in-migrants had higher levels of education on average than natives, this alone does not indicate a shortage of college graduates. A complete picture requires that one examine the *out*-migration of college graduates from South Carolina as well as in-migration.

C. Outflows of Four-Year College Graduates

Table **II.C.1** shows the 1990 state of residence for four-year college graduates born in the Carolinas and Georgia. Only 44.2 percent of college graduates born in South Carolina lived there in 1990, compared with 56.7 percent in North Carolina, and 56.6 percent in Georgia. Of college graduates who were born in South Carolina but left, most (10 percent) went to North Carolina and Georgia (7.4 percent). Not far behind, however, were the states of New York (6.9 percent), Florida (6.1 percent), and Virginia (4.8 percent). Of college-educated individuals born in North Carolina, 5 percent lived in Georgia, followed by Florida (4.8 percent), South Carolina (4.4 percent), and Virginia. The most common destinations for college-educated individuals born in Georgia were Florida (7.2 percent), Alabama (5.2 percent), with third place being a tie between California (!), North Carolina, and Virginia (3.4 percent each).

Table II.C.1. 1990 State of Residence of Four-Year College Graduates Age 25-55

Born in:	South Carolina		North Carolina			Georgia	
Residence	Percent	Cumulative Percent	Residence	Percent	Cumulative Percent*	Residence	Percent	Cumulative Percent*
South Carolina	**44.2**		**North Carolina**	**56.7**		**Georgia**	**56.6**	
North Carolina	**10**	**54.2**	**Georgia**	**5**	**61.7**	Florida	7.2	63.8
Georgia	**7.4**	**61.6**	Florida	4.8	66.5	Alabama	5.2	69.0
New York	6.9	68.5	**South Carolina**	**4.4**	**70.9**	California	3.4	72.4
Florida	6.1	74.6	Virginia	4.4	75.3	**North Carolina**	**3.4**	**75.8**
Virginia	4.8	79.4	California	3	78.3	Virginia	3.4	79.2
Texas	2.6	82.0	New York	2.8	81.1	Texas	2.8	82.0
California	2.2	84.2	Maryland	2.2	83.3	**South Carolina**	**2.3**	**84.3**
Tennessee	2.2	86.4	Tennessee	2	85.3	Illinois	1.6	85.9
Pennsylvania	1.7	88.1	Michigan	1.8	87.1	Mississippi	1.6	87.5
Alabama	1.3	89.4	Texas	1.8	88.9	Tennessee	1.6	89.1
DC	1.3	90.7	New Jersey	1.6	90.5	New York	1.3	90.4
Maryland	1.3	92.0	DC	1.2	91.7	Michigan	1	91.4
Indiana	0.9	92.9	Alabama	1	92.7	New Jersey	1	92.4
Ohio	0.9	93.8	Colorado	0.8	93.5	Indiana	0.8	93.2
Oklahoma	0.9	94.7	Kentucky	0.8	94.3	Pennsylvania	0.8	94.0
Washington	0.9	95.6	Pennsylvania	0.8	95.1	Connecticut	0.5	94.5
Colorado	0.4	96.0	Arizona	0.4	95.5	Iowa	0.5	95.0
Connecticut	0.4	96.4	Hawaii	0.4	95.9	Kentucky	0.5	95.5
Illinois	0.4	96.8	Illinois	0.4	96.3	Massachusetts	0.5	96.0
Kansas	0.4	97.2	Indiana	0.4	96.7	New Mexico	0.5	96.5
Louisiana	0.4	97.6	Massachusetts	0.4	97.1	Ohio	0.5	97.0
Maine	0.4	98.0	Nevada	0.4	97.5	Alaska	0.3	97.3
Massachusetts	0.4	98.4	New Mexico	0.4	97.9	Arkansas	0.3	97.6
Missouri	0.4	98.8	Oregon	0.4	98.3	Colorado	0.3	97.9
Montana	0.4	99.2	Washington	0.4	98.7	DC	0.3	98.2
New Jersey	0.4	99.6	Connecticut	0.2	98.9	Hawaii	0.3	98.5
Wisconsin	0.4	100.0	Louisiana	0.2	99.1	Maine	0.3	98.8
Alaska	0	100.0	Missouri	0.2	99.3	Maryland	0.3	99.1
Arizona	0	100.0	Nebraska	0.2	99.5	New Hampshire	0.3	99.4
Arkansas	0	100.0	New Hampshire	0.2	99.7	Oregon	0.3	99.7
Hawaii	0	100.0	Ohio	0.2	99.9	Utah	0.3	100.0
Iowa	0	100.0	Alaska	0	99.9	Washington	0.3	100.3
Kentucky	0	100.0	Arkansas	0	99.9	Arizona	0	100.3
Michigan	0	100.0	Iowa	0	99.9	Kansas	0	100.3
Mississippi	0	100.0	Kansas	0	99.9	Louisiana	0	100.3
Nebraska	0	100.0	Maine	0	99.9	Missouri	0	100.3
Nevada	0	100.0	Mississippi	0	99.9	Montana	0	100.3
New Hampshire	0	100.0	Montana	0	99.9	Nebraska	0	100.3
New Mexico	0	100.0	Oklahoma	0	99.9	Nevada	0	100.3
Oregon	0	100.0	Utah	0	99.9	Oklahoma	0	100.3
Utah	0	100.0	Wisconsin	0	99.9	Wisconsin	0	100.3

*Note: Column Does Not Total to 100% Due to Rounding Error

D. Net In-Migration of Four-Year College Graduates

If a state has a surplus of college graduates, more college graduates will move out of the state than will move in. Table **II.D.1** shows net in-migration of college graduates as a fraction of all college graduates for all 50 states.[1] The net inflow of college graduates was positive in both Carolinas and in Georgia (that is, more college graduates moved in than moved out). The net inflows were smallest in South Carolina, at about 7.4 percent of all college graduates. The net inflows of college graduates were substantially larger in North Carolina, at 20 percent, and in Georgia, at a remarkable 50 percent. Nevertheless, the data indicate that South Carolina has attracted more college graduates from outside the state than have left the state.

It is worth examining the experience of other states to put South Carolina's experience in perspective. Large net outflows of college graduates occurred in Midwest states such as Illinois, Indiana, and Iowa, Southern states such as Kentucky and Louisiana, Northeastern states such as Michigan, Ohio, and Wisconsin, and states in the Middle Atlantic such as New York and Pennsylvania. The net flow of college graduates is strongly related to the overall growth of states. For decades, population has been flowing out of the old industrial Northeast, and into the South, West, and Southwest. These states have tended to lose college graduates, while states in growing regions have tended to attract them. South Carolina's net inflow of college graduates, in other words, can be traced at least in part to the decades-long redistribution of population within the United States.

[1]Using data from the one percent PUMS sample for the U.S. as a whole, I computed the number of college graduates who were born in each state and the number of college graduates who were currently residing in each state in 1990. I measured the net inflow as the percent change between the number currently residing in the state and the number who were born in that state. Census data do not contain information on where individuals attended school, or how old they were when they entered the state. Therefore, individuals I define as in-migrants may have entered at a very young age, and not necessarily after they received their college degree. A similar problem exists in the definition of natives.

Table II.D.1. Net Inflow of Four-Year College Grads by State, 1990

State	Number in Sample Born	Residing	Change
South Carolina	**231**	**248**	**7.4%**
Georgia	**387**	**580**	**49.9%**
North Carolina	**499**	**600**	**20.2%**
Florida	421	1172	178.4%
Alabama	314	271	-13.7%
West Virginia	199	122	-38.7%
Delaware	66	88	33.3%
DC	202	102	-49.5%
Maryland	304	654	115.1%
Virginia	407	802	97.1%
Kentucky	283	251	-11.3%
Louisiana	362	284	-21.5%
Mississippi	264	171	-35.2%
Tennessee	361	394	9.1%
New Jersey	801	1033	29.0%
New York	2675	2165	-19.1%
Pennsylvania	1489	1037	-30.4%
Arkansas	158	122	-22.8%
Oklahoma	303	243	-19.8%
Texas	1125	1653	46.9%
Wyoming	48	37	-22.9%
Illinois	1308	1102	-15.7%
Indiana	518	417	-19.5%
Iowa	407	230	-43.5%
Kansas	287	261	-9.1%
Missouri	542	423	-22.0%
Connecticut	363	518	42.7%
Maine	116	130	12.1%
Massachusetts	834	885	6.1%
New Hampshire	69	134	94.2%
Rhode Island	128	121	-5.5%
Vermont	40	65	62.5%
Alaska	15	48	220.0%
California	1664	3433	106.3%
Hawaii	93	120	29.0%
Oregon	181	287	58.6%
Washington	337	509	51.0%
Michigan	979	778	-20.5%
Ohio	1021	823	-19.4%
Wisconsin	516	375	-27.3%
Idaho	79	73	-7.6%
Minnesota	470	413	-12.1%
Montana	106	74	-30.2%
Nebraska	199	127	-36.2%
North Dakota	98	32	-67.3%
South Dakota	106	46	-56.6%
Arizona	91	333	265.9%
Colorado	236	444	88.1%
Nevada	27	84	211.1%
New Mexico	89	109	22.5%
Utah	150	156	4.0%

E. Birth State of Four-Year College Graduates

Table II.E.1 shows the state of birth of college graduates residing in the Carolinas and Georgia in 1990. About 53 percent of college graduates residing in South Carolina were in-migrants, compared with 51 percent in North Carolina, and an astonishing 63 percent in Georgia. Not surprisingly, the largest sources of college-educated in-migrants in South Carolina were North Carolina, contributing 8 percent, and Georgia, contributing 5 percent of South Carolina's college graduates.

It is not surprising that South Carolina, a small and less-educated state, contributed relatively few college graduates to either North Carolina or Georgia. It is nevertheless remarkable that the largest source of college-educated in-migrants into North Carolina was New York, which made up 4.8 percent of all college graduates in 1990. New York-born college graduates also comprised 4.7 percent of Georgia's college graduate population, and 3.8 percent of South Carolina's.

Virginians were fairly strongly represented in the Carolinas, making up 2.5 percent of college graduates in South Carolina and 4.3 percent in North Carolina. However, they made up only 1.9 percent of college graduates in Georgia. Pennsylvania and Ohio were also represented, together contributing 5.1 percent of college graduates in South Carolina, 5.6 in North Carolinian, and 6 percent in Georgia.

Table II.E.1. State of Birth of Four-Year College Graduates, by 1990 State of Residence

1990 State of Residence					
South Carolina		North Carolina		Georgia	
State of Birth		State of Birth		State of Birth	
South Carolina	**47**	**North Carolina**	**49**	**Georgia**	**36.7**
North Carolina	**7.8**	New York	4.8	Alabama	4.7
Georgia	**4.7**	Virginia	4.3	New York	4.7
New York	3.8	**South Carolina**	**3.4**	Florida	4.2
Pennsylvania	2.8	Pennsylvania	3.1	Tennessee	3.5
Virginia	2.5	Ohio	2.5	**North Carolina**	**3.2**
Ohio	2.3	**Georgia**	**2.1**	Ohio	3.1
Florida	2.2	New Jersey	2	Pennsylvania	2.9
Tennessee	1.9	Illinois	1.8	**South Carolina**	**2.8**
New Jersey	1.6	Florida	1.7	Illinois	2.6
Alabama	1.5	Tennessee	1.7	Texas	1.9
Illinois	1.5	Michigan	1.5	Virginia	1.9
California	1.3	West Virginia	1.4	Michigan	1.8
Texas	1.3	California	1.3	New Jersey	1.7
Michigan	1.2	Maryland	1.2	California	1.5
Massachusetts	1.1	Texas	1.2	Louisiana	1.4
West Virginia	1.1	Alabama	1.1	Mississippi	1.4
Indiana	1	Massachusetts	1.1	Indiana	1.3
Kentucky	1	Indiana	1	Kentucky	1.3
Louisiana	0.8	DC	0.9	Massachusetts	1.1
DC	0.6	Kentucky	0.9	Missouri	1.1
Maryland	0.6	Missouri	0.7	Maryland	0.8
Mississippi	0.6	Wisconsin	0.7	West Virginia	0.8
Wisconsin	0.6	Connecticut	0.6	Wisconsin	0.8
Connecticut	0.5	Louisiana	0.6	DC	0.7
Missouri	0.5	Minnesota	0.5	Arkansas	0.6
Iowa	0.4	Mississippi	0.5	Iowa	0.6
Kansas	0.4	Iowa	0.4	Connecticut	0.5
Minnesota	0.4	Kansas	0.4	Minnesota	0.5
Oklahoma	0.4	Arkansas	0.3	Oklahoma	0.5
Washington	0.4	Nebraska	0.3	Kansas	0.4
Arkansas	0.3	Oklahoma	0.3	Nebraska	0.3
Colorado	0.3	Colorado	0.2	Washington	0.3
Nebraska	0.3	Delaware	0.2	Colorado	0.2
Delaware	0.2	Maine	0.2	Delaware	0.2
Maine	0.2	Rhode Island	0.2	Maine	0.2
Oregon	0.2	Washington	0.2	Oregon	0.2
Rhode Island	0.2	Alaska	0.1	Rhode Island	0.2
Alaska	0.1	Arizona	0.1	Alaska	0.1
Arizona	0.1	Hawaii	0.1	Arizona	0.1
Hawaii	0.1	Idaho	0.1	Hawaii	0.1
Idaho	0.1	Montana	0.1	Idaho	0.1
Montana	0.1	New Hampshire	0.1	Montana	0.1
New Hampshire	0.1	New Mexico	0.1	New Hampshire	0.1
New Mexico	0.1	North Dakota	0.1	New Mexico	0.1
North Dakota	0.1	Oregon	0.1	North Dakota	0.1
South Dakota	0.1	South Dakota	0.1	South Dakota	0.1
Utah	0.1	Utah	0.1	Utah	0.1
Vermont	0.1	Vermont	0.1	Vermont	0.1
Wyoming	0.1	Nevada	0	Wyoming	0.1
Nevada	0	Wyoming	0	Nevada	0

F. Why Do College Graduates Move?

The movements of college-educated individuals across states are remarkably large. Why do these movements occur? First, the demand for college graduates by any particular firm is not perfectly coordinated with the flow of college graduates. An unusually large demand for college graduates may, in the short run, require importing graduates from other states. This is especially true when colleges specialize in certain fields, as for example Clemson specializes in engineering. Does Clemson graduate too many engineers if they find work out of the state? One may as well ask whether BMW produces too many cars, since most of them are sold in other states.

The flow of college graduates may also be related to the need to provide them with company training. Much of this training – especially for managers — must be carried out near the firm's knowledge base. Few companies with operations in South Carolina have their knowledge base located within the state. Most firms want to locate their knowledge base in a large city; South Carolina's three metropolitan areas are all relatively small. I speculate that states such as South Carolina may export younger college graduates to be trained, and import older, more experienced ones.

The flow of people – especially highly educated people – benefits South Carolina, and, indeed, the nation as a whole, because it promotes the flow of ideas. If these flows did not occur, the ability of firms to compete – to reduce costs — would be reduced. Communities, too, can benefit by the flow of new ideas into the state. One may argue that community leaders should be drawn from long-time residents of the state. On the other hand, civic life may well benefit from a free flow of ideas.

G. Should States With Net Outflows of College Graduates Fund Higher Education?

Some states – Ohio, Pennsylvania, and Iowa, for example – have experienced net outflows of college-educated individuals. Should these states reduce their support for higher education? The key benefit of a college education is increased labor productivity and earnings. The geographic location of jobs, although important from a political point of view, is less important from an individual citizen's point of view. Reducing support for higher education reduces a student's return to a college degree. Fewer students will obtain the degree, and hence will have lower earnings as a result. Such individuals may be less likely to leave the state. On the other hand, the result of such a policy is a larger number of lower-skill, lower paying jobs in the state.

III. How Much Do College Graduates Earn?

A. Overview

Table III.A.1 shows the 1990 distribution of hourly earnings by education level for the Carolinas, Georgia and the U.S. Each row shows earnings at three percentiles: 25, 50, and 75. Because earnings rise with age, I divided workers into two age groups: 25-35 and 36-55. The data for South Carolina are shown in Part A. About 25 percent of high school dropouts earned $3.85 or less; 50 percent earned less than $5.68 per hour (and hence about 50 percent earned more than this amount); and 25 percent earned more than $8.01. Older South Carolinian dropouts earned about 24-25 percent more than their younger counterparts.

The median hourly earnings of young high school graduates in South Carolina was $6.26, about (6.25/5.68 – 1 =) 10 percent more than young high school dropouts. Similarly, the median older high school graduate earned $8.47 per hour, about 19 percent more than dropouts. The high school wage premiums in North Carolina were similar. The high school wage premiums for high school graduates in Georgia were higher, at 17 percent for younger workers, and 25 percent for older workers.

Among younger South Carolinians, the median four-year college graduate earned $9.99 per hour, about 60 percent more than the median high school graduate, and 76 percent more than the median high school dropout. For older workers, the figures were 72 percent and 104 percent, respectively. The figures for North Carolina were, again, similar. The college/high-school pay gap was similar in Georgia, but the college/high-school dropout pay gap was much larger.

The high school wage premium in the U.S. as a whole was higher than in the Carolinas. Among younger workers, the median U.S. high school graduate earned 27 percent more than the median dropout, compared with only 9-10 percent in the Carolinas. Among older workers, the difference was smaller, but still substantial; the median high school graduate earned 23 percent more in the U.S., compared with 19 percent in the Carolinas. Finally, young four-year college graduates at the median earned 67 percent more than high school graduates at the median, and older college graduates 65 percent more, compared with 62 and 72 percent in the Carolinas

Table III.A.1. Hourly Earnings Distributions by Age Group, Education Level and State, 1990

A. South Carolina

	Workers Aged 25-35					Workers Aged 36-55				
	<HS	HS	Assoc	BA	>BA	<HS	HS	Assoc	BA	>BA
75% Earn More Than:	$3.85	$4.50	$6.01	$6.99	$9.00	$4.81	$5.88	$7.69	$9.62	$12.02
50% Earn More Than:	$5.68	$6.25	$8.33	$9.99	$12.78	$7.07	$8.41	$10.87	$14.42	$16.60
25% Earn More Than:	$8.01	$8.71	$11.64	$14.00	$16.83	$10.00	$12.02	$14.90	$20.15	$21.79

B. North Carolina

75% Earn More Than:	$4.08	$4.67	$6.00	$7.31	$9.09	$5.00	$6.00	$7.50	$9.62	$12.02
50% Earn More Than:	$5.77	$6.29	$8.27	$10.21	$12.50	$7.00	$8.33	$10.58	$14.38	$16.13
25% Earn More Than:	$8.00	$8.65	$11.54	$13.95	$16.87	$9.69	$12.00	$14.90	$19.74	$22.12

C. Georgia

75% Earn More Than:	$4.00	$4.81	$6.25	$8.00	$10.00	$4.81	$6.15	$8.39	$10.34	$12.78
50% Earn More Than:	$5.77	$6.73	$8.85	$11.06	$14.00	$7.21	$9.00	$12.02	$15.34	$17.34
25% Earn More Than:	$8.17	$9.44	$12.50	$15.10	$18.75	$10.53	$13.02	$16.67	$21.72	$23.56

D. U.S.

75% Earn More Than:	$3.49	$4.38	$5.67	$7.41	$8.93	$4.26	$5.45	$7.21	$8.97	$11.05
50% Earn More Than:	$5.31	$6.73	$8.59	$11.25	$13.89	$7.14	$8.75	$11.54	$14.42	$17.79
25% Earn More Than:	$8.32	$10.00	$12.64	$15.69	$19.23	$11.50	$13.37	$16.50	$21.33	$25.00

B. How Many Four-Year College Graduates Earn Less than High School Graduates?

In this section I ask, How many college graduates earn less than high school graduates. The answers are contained in **Table III.B.1**. Look in the first row of Part A. About 25 percent of young high school graduates in South Carolina earned $4.50 per hour or less (compare with the first row, second column of Part A of Table II.A.1). This means that 75 percent of high school graduates earned more than this amount. By contrast, nearly 91 percent of young college graduates earned more than $4.50. Or, put differently, 25 percent of young high school graduates earned less than $4.50 per hour, compared with only 9 percent of young college graduates. Among older workers, 92 percent of college graduates earned more than $5.88 compared with only 75 percent of high school graduates. Or, put differently, 25 percent of older high school graduates earned less than $5.88 per hour compared with 8 percent of college graduates.

Only half of the young high school graduates in South Carolina earned more than $6.25 per hour compared with 81 percent of college graduates. Put differently, about half earned less than $6.25 per hour compared with 19 percent of college graduates. Thus, we can say that 81 percent of young South Carolinian college graduates earned more than the median high school graduate. The corresponding figures were 82 percent in North Carolina, 83 percent in Georgia, and 73 percent in the U.S. as a whole. The figures for older workers were similar.

Let us now examine the top 25 percent of the wage distribution. The top quartile of young high school graduates in South Carolina earned $8.71 per hour or more, compared with 61 percent of college graduates. In North Carolina, the top quartile of young high school graduates earned $8.65 or more, compared with 64 percent of college graduates; the comparable figures for college graduates in Georgia and the nation were 63, and 54 percent, respectively. The figures for older workers were similar to those for younger workers.

To summarize, the distribution of wages of college graduates lies well to the right of that of high school graduates, with a small degree of overlap. Moreover, these comparisons probably *over-state* the degree of overlap because college graduates have fewer years of labor market experience than high school graduates within an age group.

C. Quantifying the Wage Premium of a College Degree

A variety of factors other than education affect earnings. Regression analysis is a highly efficient way to compare differences in earnings due purely to differences in education, which will be called the *educational wage premium*. **Table III.C.1** contains estimates of educational wage premiums for the year 1990, controlling for the effects of gender, race, and years of potential work experience.[1]

The first row of each part of Table III.C.1 shows the earnings premiums associated with each level of education relative to high school dropouts. For example, high school graduates in South Carolina, shown in Part A, earned 18.5 percent more than otherwise comparable high school dropouts. The high school premium was slightly lower in North Carolina (Part B), at 17.7 percent, but markedly higher (21 percent) in Georgia (Part C) and the nation (Part D).

The second rows of each part of Table III.C.1 show earnings premiums relative to high school graduates. For example, four-year college graduates in South Carolina earned about 46 percent more than did otherwise comparable high school graduates. The college wage premium was slightly higher in North Carolina (49 percent), and higher still in Georgia and the U.S. (51 percent). Two-year college earned 25 percent more than did high school graduates in South Carolina, compared with 24 percent in North Carolina, 28 percent in Georgia, and 26 percent in the nation.

The fourth rows compare the earnings of two- and four-year college graduates. Four-year college graduates earned about 21 percent more than two-year college graduates in South Carolina, which was slightly smaller than the premium in North Carolina (25 percent), Georgia (23 percent), or the nation (25 percent). Finally, the fifth rows show that advanced degree holders earned 17.8 percent more than four-year college graduates in South Carolina – a higher premium than in either North Carolina or Georgia — and nearly identical to the wage premium of 18 percent in the nation.

[1]I restricted the remainder of my analysis to individuals who worked at least four weeks in the previous year at least 10 hours per week and who earned at least $50 per week. I estimated the following regression by state: Log(Weekly Wage) = f(Education, Work Experience, Marital Status, Sex, Race) + Error.

Table III.C.1. Earnings Premiums for Various Levels of Education, 1990

Base Group	HS Degree	Some College	Two-Year College Degree	Four-Year College Degree	Advanced Degree
A. South Carolina					
Dropouts	18.5%	26.9%	43.2%	64.2%	82.0%
HS Degree		8.4%	24.7%	45.7%	63.4%
Some College			16.3%	37.3%	55.0%
Two-Year Coll. Degree				20.9%	38.7%
Four-Year Coll. Degree					17.8%
B. North Carolina					
Dropouts	17.7%	27.1%	41.7%	66.5%	82.5%
HS Degree		9.5%	24.1%	48.8%	64.9%
Some College			14.6%	39.4%	55.4%
Two-Year Coll. Degree				24.8%	40.8%
Four-Year Coll. Degree					16.1%
C. Georgia					
Dropouts	21.4%	35.1%	49.1%	72.2%	88.0%
HS Degree		13.7%	27.6%	50.8%	66.5%
Some College			13.9%	37.1%	52.8%
Two-Year Coll. Degree				23.2%	38.9%
Four-Year Coll. Degree					15.7%
D. United States					
Dropouts	21.1%	34.0%	46.6%	72.1%	90.0%
HS Degree		12.9%	25.5%	50.9%	68.9%
Some College			12.5%	38.0%	56.0%
Two-Year Coll. Degree				25.5%	43.4%
Four-Year Coll. Degree					18.0%

D. How Has the College Wage Premium Changed Over Time?

Table III.D.1 contains estimates of education wage premiums for the year 1980.[1] The high school wage premium rose markedly between 1980 and 1990, from 11.3 to 18.5 percent in South Carolina; from 13.2 to 17.7 percent in North Carolina; from 15 to 21.4 percent in Georgia; and from 10 to 21.1 percent in the nation. The reason for this increase is not known. One possibility is that the prices for skills held by each type of worker changed in favor of high school graduates. A second possibility is that the quality of high school students increased relative to that of dropouts. Clearly, this is an interesting topic for future research.

The four-year college wage premium (relative to a high school degree) rose as well, from 39 to 46 percent in South Carolina; from 41 to 49 percent in North Carolina; from 38 to 51 percent in Georgia; and from 36 to 51 percent in the nation. This occurred despite an increase in the proportion of the population with a four-year college degree or better. Although the supply of highly educated individuals rose between 1980 and 1990, demand apparently rose faster.

Does this mean that people are investing too little in education? Determining the optimum level of human capital investment requires that one compare the rate of return on education with those of other investments – for example, in the stock market. Simply put, one must look at costs as well as benefits. Indeed, the price of a college education rose markedly faster than the price of other goods and services over this time period. In the next section, I lay the groundwork for computing the financial rate of return to a college education.

[1] Because the data for 1980 did not distinguish between individuals with a two-year college degree and those with some college but no degree, I combined them into a single category.

Table III.D.1. Earnings Premiums for Various Levels of Education, 1980

A. South Carolina Base Group	HS Degree	Some College/ Two-Year Coll. Degree	Four-Year College Degree	Advanced Degree
Dropouts	11.3%	21.6%	49.9%	71.1%
High School Degree		10.3%	38.6%	59.8%
Some College/Two-Year Coll. Degree			28.2%	49.5%
Four-Year College Degree				21.2%
B. North Carolina				
Dropouts	13.2%	24.2%	54.3%	70.9%
High School Degree		11.0%	41.2%	57.7%
Some College/Two-Year Coll. Degree			30.2%	46.7%
Four-Year College Degree				16.6%
C. Georgia				
Dropouts	15.0%	26.8%	52.5%	70.0%
High School Degree		11.8%	37.5%	55.0%
Some College/Two-Year Coll. Degree			25.7%	43.2%
Four-Year College Degree				17.5%
D. United States				
Dropouts	10.0%	20.3%	45.6%	59.8%
High School Degree		10.4%	35.6%	49.8%
Some College/Two-Year Coll. Degree			25.2%	39.5%
Four-Year College Degree				14.3%

IV. Cost-Benefit Analysis of College Education

A. Overview

The return to any investment project is equal to the difference between the benefit and cost. I assume that the benefit of a college degree is the higher salary earned by college graduates.[1] The costs include tuition, books, and fees.[2] If we are interested in a student's private rate of return, we only include those costs paid by the student. If we are interested in the rate of return to society as a whole, all costs – regardless of who pays them – should be included. The cost of a college degree also includes labor market earnings foregone while in school. With this in mind, the financial return to a college degree may therefore be expressed as:

Benefit - Cost =

Earnings of College Graduates –

{Tuition + Cost of Books and Other Fees} –

Earnings of High School Graduates.

To illustrate how to apply cost-benefit analysis, suppose that an eighteen-year-old high school graduate, Maria, must decide whether to continue her education or go to work. Suppose that Maria can earn a salary of $15,000 per year with her high school degree, and can earn $20,000 per year after she obtains a four-year college degree. For simplicity, let us make the following additional assumptions:

1. Maria works for 50 years in the labor market.
2. Maria has a scholarship that pays for all college costs, including tuition, books, and other fees.
3. Maria does not work while in college.
4. Maria receives her salary in one payment at the start of each year.

Maria's options are shown in **Table IV.A.1.**

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[1] The benefits of college are not necessarily limited to a higher salary, however. First, individuals who are in college generally enjoy far higher levels of leisure than high school graduates who are in the labor market. Second, some individuals may get pleasure from the experience of learning.

[2] Some may object that the costs of college include room and board. However, room and board are not true costs; one must eat and house oneself whether or not one goes to college.

Table IV.A.1. Maria's Payoffs From High School and College

Year	1	2	3	4	5 …	50	51 … 54		Sum
High School	$15k	$15k	$15k	$15k	$15k	… $15k	$0	$0	$750,000
College first	$0	$0	$0	$0	$20k	… $20k	$20k	$20k	$1,000,000

Table IV.A.1 shows that, over her lifetime, Maria would earn $750,000 ($15,000 per year times 50 years) with a high school degree, or $1,000,000 ($20,000 per year times 50 years) with a college degree. It is tempting to compute the net benefit of a college degree as the difference between the two, or $250,000. Notice, however, that the monetary benefits of college are delayed by four years. The only way that such a comparison would be valid is if Maria valued the $20,000 she receives in year 5 at $20,000 at the start of year 1. Put differently, Maria would have to be willing to give up $20,000 at the start of year 1 in return for $20,000 at the start of year 5. Ask yourself whether you would be willing to make this exchange. The answer, of course is emphatically, "No!" Suppose the interest rate were 5 percent. If you invested $20,000 today for four years at this rate, you would have $24,310 in four years. In other words, $20,000 today is worth more than $20,000 four years from now. For this reason, we must introduce the concept of *present value*.

B. What Is Present Value?

If Maria worked for one year as a high school graduate, she would earn $15,000. If she saved this $15,000 at a bank that paid 5 percent interest for 4 years, she would have $15,000 x $(1.05)^4$ = $18,233 in four years. Thus, the *future value* of $15,000 in 4 years at an interest rate of 5 percent is $18,233. Now, we can turn this around and ask, "How much money would Maria have to put away today in order to end up with $18,233 in four years?" The answer, of course, is $18,233 / $(1.05)^4$ = $15,000. Thus, the *present value* of $18,233 received four years in the future is $15,000 when the interest rate is 5 percent.[1]

[1] In general, the present value of an amount $A to be received t years from now at an interest rate of r is given by: $PV(\$A \mid t, i) = \$A / (1 + r)^t$.

Similarly, the present value of $20,000 received at the start of Year 5 (which is also the end of Year 4) is $20,000 / $(1.05)^4$ = $16,454. By converting the flows of salary into present values, we can make valid comparisons between Maria's choices. **Table IV.B.1** shows selected present values for Maria's choices assuming an interest rate of 5 percent.

Table IV.B.1. Present Value of Maria's Payoffs From High School and College

Year	1	2	3	4	5 …	50	51 …	54	Sum
High School	$15k	$15k	$15k	$15k	$15k …	$15k	$0	$0	$750,000
College first	$0	$0	$0	$0	$20k …	$20k	$20k…	$20k	$1,000,000
PV(HS)	$15,000	$14,286	$13,605	$12,958	$12,341 …	$1,373	$0 …	$0	$287,531
PV(Coll)	$0	$0	$0	$0	$16,454 …	$1,831	$1,744 ..	$1,435	$315,403

The *lifetime present value* of the high school alternative is the sum of the present values of high school earnings in each year, or $287,531. The lifetime present value of the college alternative is $315,403. If Maria's object is to maximize her lifetime present value, she will choose to go to college.

Thus far, I have assumed that Maria had a scholarship that paid for all tuition, books, and fees. I now relax this assumption. What is the most that Maria would pay for a college education? The difference in lifetime present value of earnings is equal to

$$\begin{aligned} PV(College) - PV(High\ School) &= \$315,403 - \$287,531 \\ &= \$27,872. \end{aligned}$$

As long as the present value of the cost of college does not exceed $27,872, Maria will choose to go to college. For example, suppose that tuition, books, and fees were $4,000 per year. The present value of the cost of four years of college is $14,893, so the *net present value of college* would be ($27,872 - $14,893 =) $12,979.

The social benefit of a college degree is equal to the private benefit only if individuals pay all costs and receive all benefits. Of course, this is seldom the case. There is a substantial subsidy at virtually all of the nation's public colleges and universities. If we are interested in computing the social net present value of a college education, we must include all costs, regardless of who pays them.

C. The Discount Rate

Thus far, I have used an interest rate of 5 percent to compute Maria's present values. However, we observe a wide range of interest rates in the world: an interest rate on savings deposits of about 5 percent, on a 30-year mortgage of about 7 percent, on a car loan of about 10 percent, and on credit cards as high as 21 percent. Some people are willing to pay very high rates of interest for the privilege of borrowing, while others are willing to accept relatively low interest rates in return for lending (saving). The wide range of savings behavior we observe is a result of differences in *the internal rate of discount*. People are willing to pay different interest rates because they place different values on future versus current consumption. Individuals who place a high weight on current consumption are said to *discount* the future at a high rate, and hence are said to have *high discount rates*. Individuals who place a higher weight on future consumption, by contrast, have *low discount rates*. The decision whether or not to attend college depends crucially on the discount rate because the costs of a college education are incurred now, and the benefits are delayed and spread out over a lifetime.

Table IV.C.1 shows the present values of Maria's choices for discount rates between 5 and 9 percent.

Table IV.C.1. Maria's Lifetime Present Values of Earnings, Selected Discount Rates

Discount Rate	PV(HS)	PV(College)	PV(College)-PV(HS)
5.0%	$287,531	$315,403	$27,872
6.0%	$250,614	$264,679	$14,066
7.0%	$221,502	$225,310	$3,808
7.5%	$209,219	$208,884	-$ 335
8.0%	$198,182	$194,227	-$3,956
9.0%	$179,224	$169,289	-$9,935

As the discount rate rises, the difference between the present value of a college degree and high school degree falls.

D. The Internal Rate of Return

Table IV.C.1 shows that at a discount rate of 7.5 percent the present values of the high school and college paths are roughly equal.[1] At discount rates higher than this, Maria would be financially better off not going to college – even if she did not have to pay any tuition. This discount rate that equalizes the present values of high school and college is called the *internal rate of return*.

The internal rate of return is an important measure of the financial value of an education. If the internal rate of return of education is higher than the rate of return on alternative investments

such as stocks and bonds, one can conclude that education is a financially sound investment. If, on the other hand, the internal rate of return to education is lower than the return on alternative investments, education is less financially sound. Of course, the benefits to college may extend beyond purely financial ones, and are necessarily more difficult to quantify. Even so, estimation of the financial returns to college is at least a good first step, and one that will be undertaken in the next section.

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[1] More precisely, the discount rate that equalizes the two paths is equal to 7.4569 percent.

V. The Financial Return to a College Degree

The interest rate that makes an individual indifferent between two different investment paths is called the *internal rate of return*. As long as the internal rate of return to a college education is no lower than the rate of return on alternative investments, investment in higher education is financially sound.

At least three difficulties arise in computing the rate of return to a college education. First, education does not affect earnings for all individuals to the same degree. To the extent that more able individuals are also more likely to attend college, the educational wage premiums shown in Tables II.C.1 and II.D.1 overstate the true rate of return. It is not feasible to solve this *selectivity problem* with the data available in the census. To the extent that selectivity is a problem, the estimates below overstate the true returns to college. A second difficulty is that the returns to college go above and beyond the higher earnings that result. For example, large numbers of students do not work while in college. The return to college should account for the higher amounts of leisure enjoyed while in school. Because the non-monetary aspects of college are difficult to measure, I ignore them in this report. To the extent that such non-monetary aspects are important, the estimates below understate the true returns to college. A third problem has to do with the non-monetary aspects of employment. To the extent that the jobs held by college graduates are less arduous, less dangerous, and have lower risk of unemployment, differences in earnings alone understate the differences in the attractiveness of jobs. It is not overly heroic to assume that the net effect of these omitted factors cancel out on average.

In the next section, I estimate the average stream of earnings that individuals at each level of education will enjoy over their working lives. I then obtain measures of the cost of education. With these data in hand, I estimate the internal rate of return to a college education. That is, I find that rate of interest at which the present value of a college education is just equal to the present value of a high school degree.

A. The Age-Earnings Profile

I used 1990 census data to estimate the *age-earnings profile*, which shows the path of earnings over the working life.[1] The estimates were carried out separately for each state for each of four schooling groups: dropouts, high school graduates, two-year college graduates, and four-year college graduates. I focus my analysis on married white men; extension to other groups is straightforward. I assumed that work careers last 50 years, beginning at age 16 for dropouts; age 18 for high school graduates; age 20 for two-year college graduates; and age 22 for four-year college graduates.[2] I assumed no part-time work while in school, 52 weeks of work per year, and 40 hours per week of work.

Age earnings profiles for South Carolina are shown in Figure V.A.1**. The earnings of high school graduates started at $270 per week (all figures are in 1990 dollars), peaked at age 45 at $531, and fell to $438 at retirement. The earnings of two-year college graduates start at $326, peak early at age 42 at $596, and decline gently to $564 at the retirement age of 69. The earnings of four-year college graduates start at $418 per week, peak at age 46 at $824, and decline to $644 per week at retirement at age 71.**

Figures V.A.2 **through** V.A.4 **show earnings profiles for North Carolina, Georgia, and the nation. The profiles for North Carolina were very similar to those for South Carolina. However, four-year college graduates earned markedly more in Georgia and the nation. Whether the reason for this difference is labor quality or differences in the character of the labor market remains an important topic for future research.**

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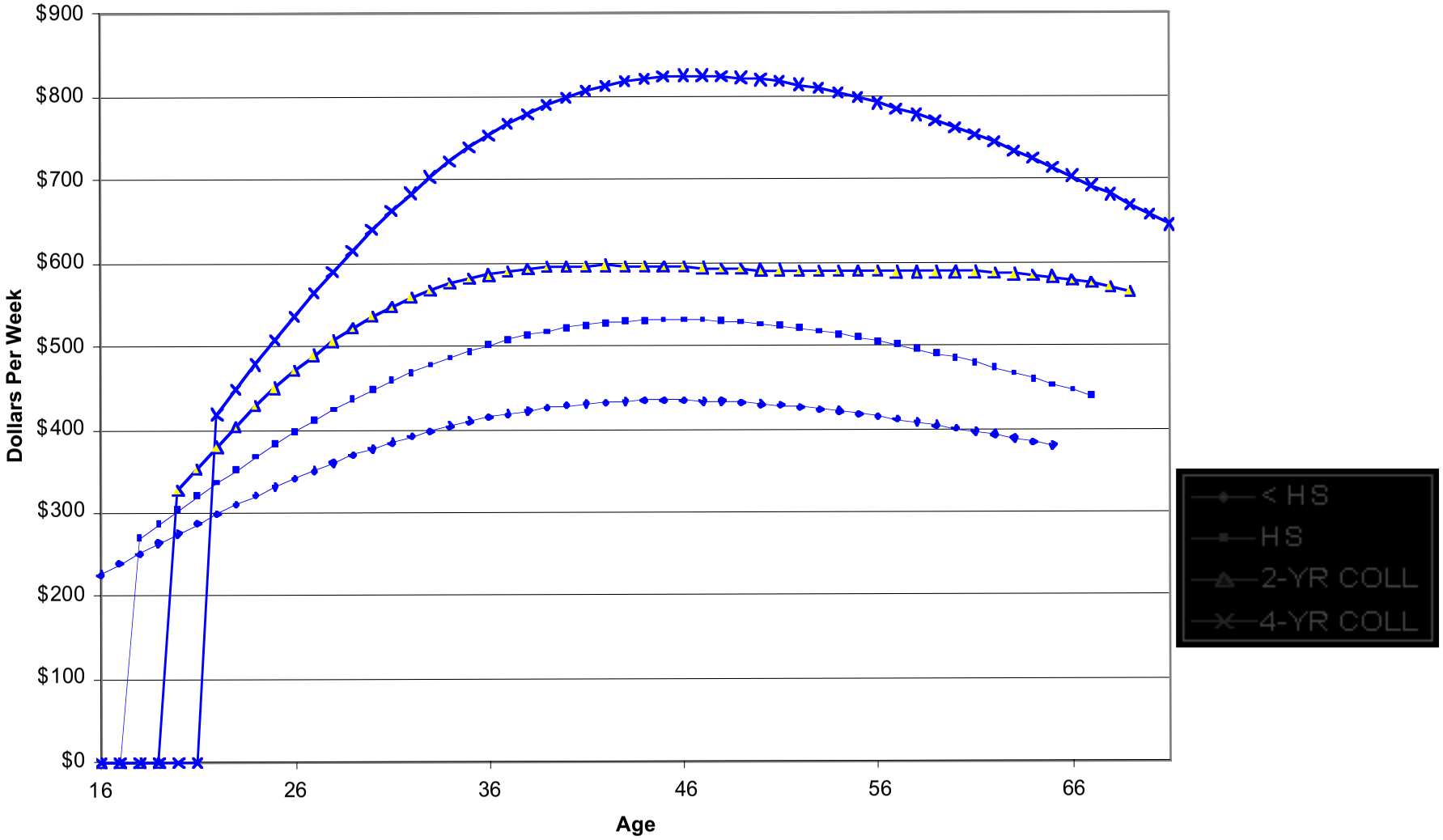
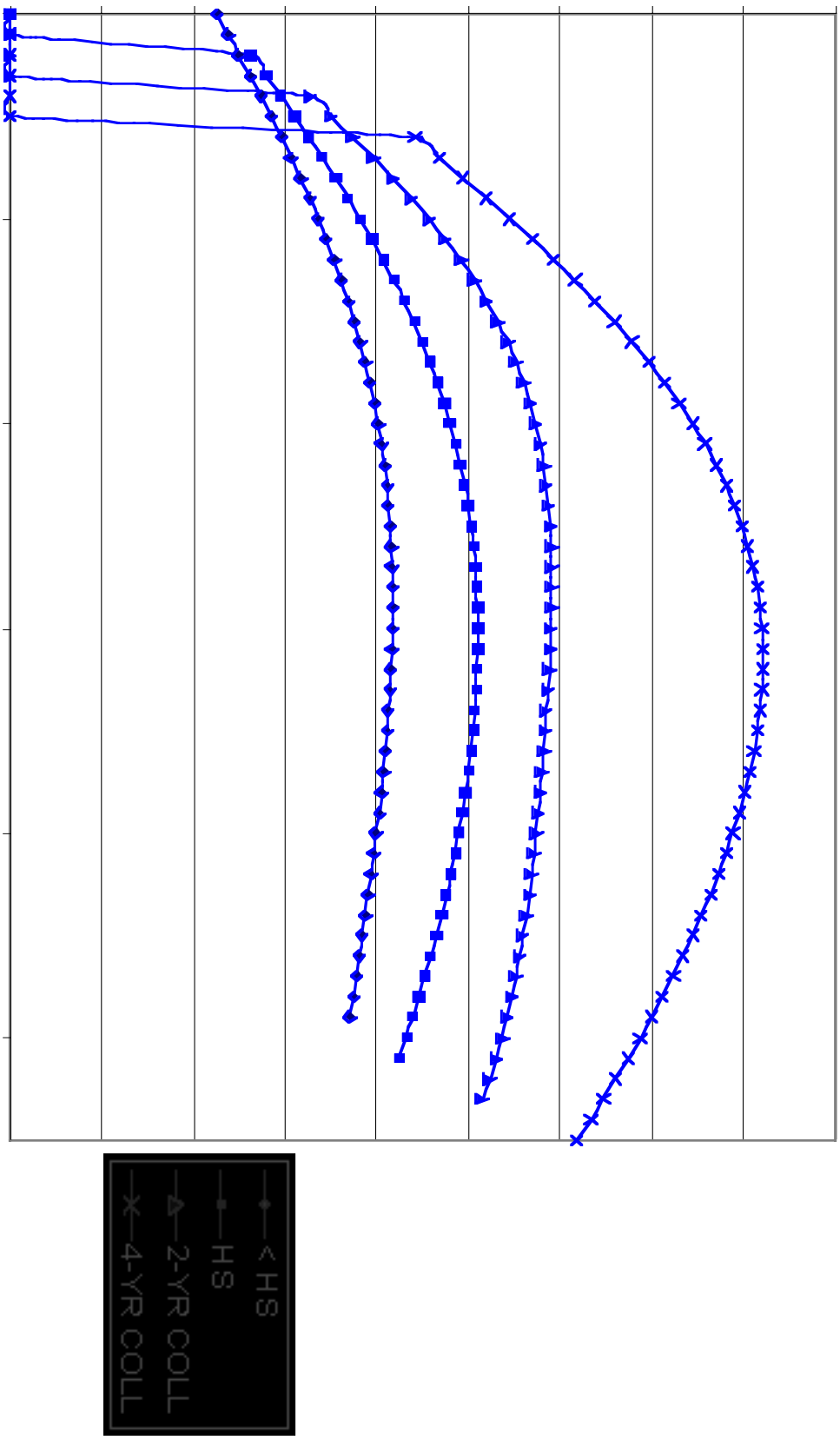
[1] The estimation was carried out using regression analysis. Expected earnings are equal to $\exp\{Xb + 0.5s^2\}$, where X is the vector of right-hand-side variables in the regression, b is the estimated slope, and s^2 is the variance of the regression. When I estimated the educational wage premia in Chapter II, I restricted the experience-earnings profile to have the same slope for all levels of education. The estimates here relax this restriction. This also allows the effects of race, sex, and marital status to vary by education level.

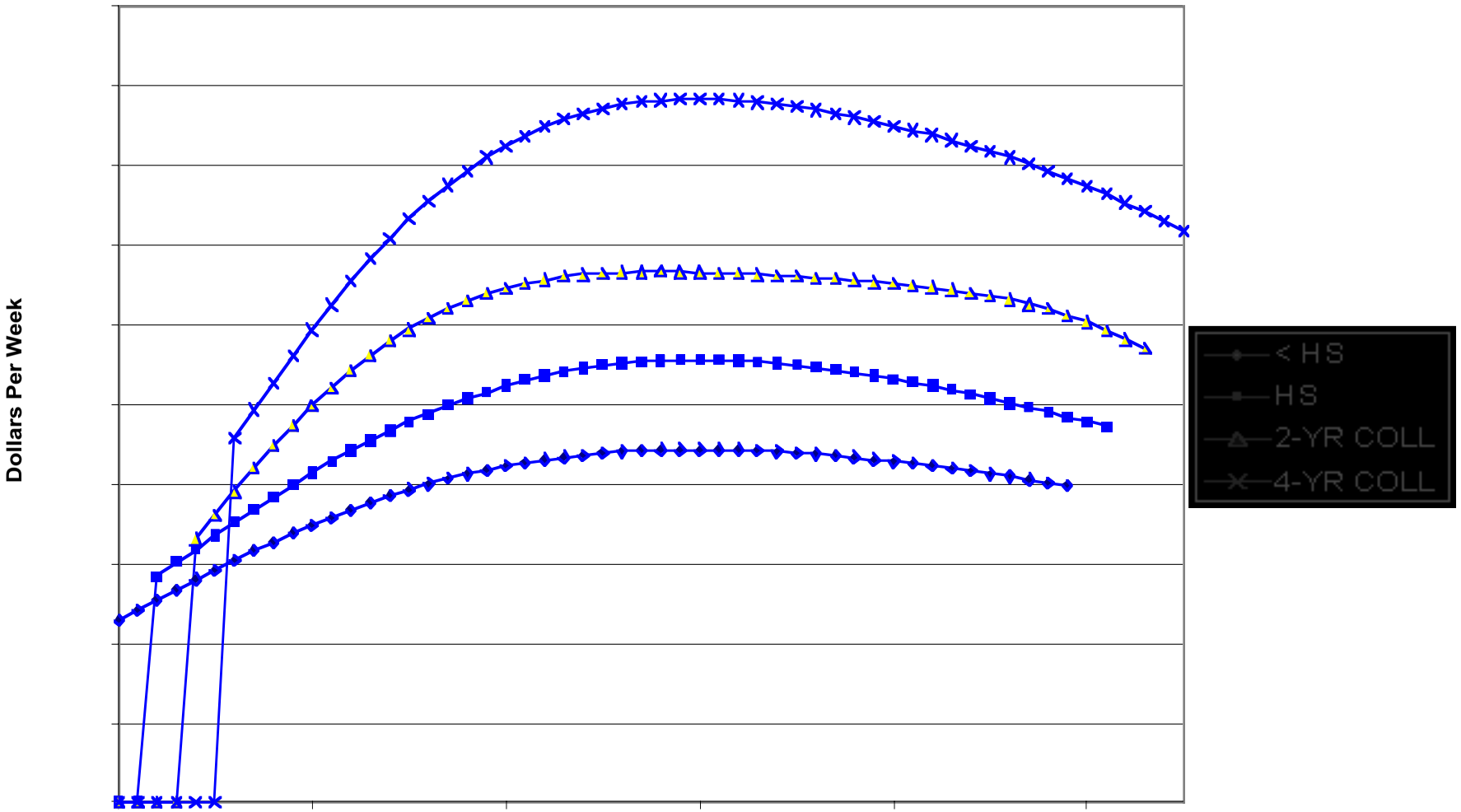
[2] This procedure is not as straightforward as it might seem. Consider a 30-year old college graduate in 1990, who will be 60 in the year 2020. This procedure assumes that his earnings will be the same (in real terms) as the earnings of a 60-year old college graduate in 1990.

Figure V.A.1: Age-Earnings Profiles by Education Level: South Carolina, 1990



Dollars Per Week




Dollars Per Week
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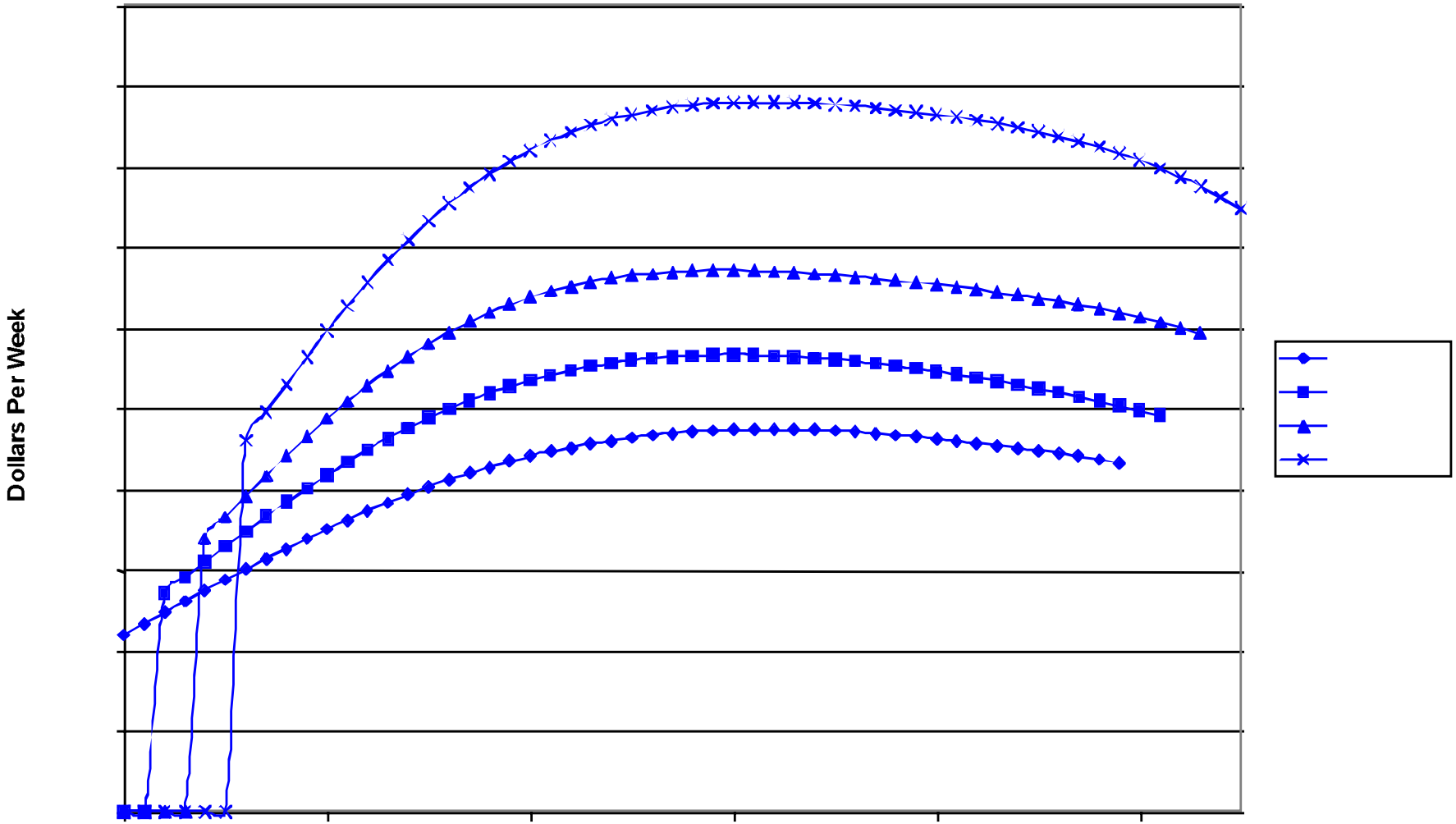
HS
2-YR COLL
4-YR COLL


Dollars Per Week

B. College Costs in South Carolina

Undergraduate tuition and fees for public institutions of higher learning in South Carolina are reported in **Table V.B.1**.[1] The figures are for the 1997-98 school year. Column (1) shows full-time equivalent (FTE) undergraduate enrollment in public institutions of higher education in South Carolina. Column (2) shows the tuition for in-state students, and column (3) shows the state appropriation per FTE for undergraduates. Column (4) shows total costs per FTE, and is equal to the sum of columns (2) and (3).

Not surprisingly, tuition is higher in doctoral-granting institutions, starting at $2,974 at South Carolina State, followed by $3,252 at Clemson and $3,534 at USC-Columbia, and led by Medical University of South Carolina at $3,648. State appropriations were about $5,000 per student at South Carolina State, Clemson University, and USC-Columbia, for a range in total costs of $8,120-$9,161 per student. State appropriations for Medical University were nearly $13,000 per undergraduate FTE, bringing total costs to $16,561 per student.

Tuition and fees at Masters'-granting institutions were similar to those prevailing at doctoral-granting institutions, ranging from a low of $2,974 at the USC campuses at Aiken and Spartanburg, to $3,918 at Winthrop University. The State's subsidy ranged between $3,561 and $4,955 per student. Total cost per undergraduate ranged from $6,851 at College of Charleston to $8,873 at Winthrop University.

Tuition at South Carolina's two-year regional campuses was $1,988, and total costs including state appropriations ranged from $5,612 at USC-Beaufort to $7,568 at USC-Union. Tuition at the state's technical colleges ranged from $840 at Williamsburg to $1,120 at Piedmont, and total costs ranged from $4,095 (Williamsburg) to $4,375 (Piedmont).

The reader cannot fail to notice the large cost differences between four-year colleges on the one hand, and two-year regional campuses and technical colleges on the other. Some might conclude that a two-year college education is a real bargain. However, such a conclusion would be premature: the costs of each type of college education can only be evaluated in relation to the benefits.

[1] These data were obtained from the web site of the Commission on Higher Education.

Table V.B.1. 1995 FTE Undergraduate Enrollment, 1997-98 Tuition, and State Appropriations

Institution	1995 Undergrad Enrollment (1)	In-State Expenditures Tuition (2)	In-State Expenditures State (3)	Sum of (2) and (3) (4)
Doctoral-Granting				
Clemson	12,356	$3,252	$5,381	$8,633
SC State University	3,974	$2,974	$5,146	$8,120
USC Columbia	14,373	$3,534	$5,627	$9,161
Medical University of SC	898	$3,648	$12,913	$16,561
Masters-Granting				
The Citadel	2,338	$3,498	$4,620	$8,118
College of Charleston	7,946	$3,290	$3,561	$6,851
Coastal Carolina	3,576	$3,100	$3,942	$7,042
Francis Marion University	3,057	$3,270	$4,390	$7,660
Lander University	2,111	$3,600	$4,419	$8,019
USC Aiken	2,244	$2,974	$4,343	$7,317
USC Spartanburg	2,526	$2,974	$4,476	$7,450
Winthrop University	3,795	$3,918	$4,955	$8,873
Total FTE Four-Year Enrollment	59,194			
Two-Year Regional				
USC-Beaufort	563	$1,988	$3,624	$5,612
USC-Lancaster	633	$1,988	$4,378	$6,366
USC-Salkehatchie	513	$1,988	$4,649	$6,637
USC-Sumter	854	$1,988	$4,493	$6,481
USC-Union	189	$1,988	$5,580	$7,568
Two-Year Regional FTE Enrollment	2,752			
Technical Colleges				
Aiken	1,438	$998	$3,255	$4,253
Central Carolina	1,369	$846	$3,255	$4,101
Chesterfield-Marlboro	574	$1,000	$3,255	$4,255
Denmark	680	$1,080	$3,255	$4,335
Florence-Darlington	2,052	$1,100	$3,255	$4,355
Greenville	5,412	$1,080	$3,255	$4,335
Horry-Georgetown	2,186	$1,115	$3,255	$4,370
Midlands	6,148	$1,110	$3,255	$4,365
Orangeburg-Calhoun	1,282	$1,008	$3,255	$4,263
Piedmont	1,825	$1,120	$3,255	$4,375
Spartanburg	1,711	$1,100	$3,255	$4,355
TC of the Low Country	734	$1,000	$3,255	$4,255
Tri-County	2,013	$900	$3,255	$4,155
Trident	5,433	$1,064	$3,255	$4,319
Williamsburg	354	$840	$3,255	$4,095
York	2,171	$936	$3,255	$4,191
Technical FTE Enrollment	35,382			

C. College Tuition in Other States

Table V.C.1 shows how college tuition in South Carolina compares with that in other states.[1] Tuition at South Carolina's four-year colleges and universities is considerably higher than in North Carolina and Georgia. For example, tuition in North Carolina in 1996-97 averaged $1,802, which was less than 60 percent of South Carolina's average of $3,206. Tuition in Georgia was slightly higher than in North Carolina, at $2,244, about 70 percent of the South Carolina average.[2] Although four-year college tuition in South Carolina is significantly higher than in North Carolina and Georgia, it is not far from the national average of $2,986. Also, tuition is 17 percent lower than in Maryland or Virginia, and 23 percent lower than in Delaware. Table V.C.1 also shows that tuition in South Carolina's two-year colleges of $1,114 was close to the regional average, and slightly lower than the national average of $1,283.

The ratio of tuition in four-year colleges to tuition in two-year colleges is shown in column (5) of table V.C.1. Tuition in four-year colleges averaged nearly three times the tuition in two-year colleges in South Carolina. About the same ratio prevailed in North Carolina, while that average nationwide was 2.3. Finally, column (6) of table V.C.1 shows the ratio of four-year to two-year enrollment. About 10 percent more students were enrolled in four-year than two-year colleges in South Carolina, and about 10 percent fewer in North Carolina and the nation. By contrast, 50 percent more students were enrolled in four-year than two-year colleges in Georgia.

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[1]These data are for the 1996-97 year and are taken from *Digest of Education Statistics*, 1997.

[2] These figures do not take into account the HOPE or LIFE scholarships.

Table V.C.1. College Tuition and Fall Enrollment in the 50 U.S. States

	Four Year Public		Two-Year Public		Comparisons	
	In-State Tuition	Undergrad Enrollment	In-State Tuition	Undergrad Enrollment	4-Yr/2-Yr Tuition	4-Yr/2-Yr Enrollment
	(1)	(2)	(3)	(4)	(5)	(6)
South Carolina	$3,206	64,392	$1,114	60,893	2.9	1.1
North Carolina	$1,802	126,705	$581	145,685	3.1	0.9
Georgia	$2,244	129,516	$1,110	88,257	2.0	1.5
Delaware	$4,180	21,043	$1,330	11,664	3.1	1.8
Florida	$1,789	162,993	$1,151	323,646	1.6	0.5
Maryland	$3,848	85,499	$2,103	109,119	1.8	0.8
Tennesee	$2,051	92,528	$1,046	78,094	2.0	1.2
Virginia	$3,962	120,521	$1,465	128,345	2.7	0.9
West Virginia	$2,088	56,128	$1,376	6,980	1.5	8.0
Alabama	$2,363	102,416	$1,358	76,657	1.7	1.3
Kentucky	$2,241	85,354	$1,211	43,279	1.9	2.0
Mississippi	$2,497	47,677	$952	51,753	2.6	0.9
New Jersey	$4,269	107,040	$1,947	133,240	2.2	0.8
New York	$3,797	270,003	$2,519	252,763	1.5	1.1
Pennsylvania	$4,994	191,053	$2,012	106,496	2.5	1.8
Connecticut	$4,105	41,952	$1,722	42,828	2.4	1.0
Maine	$3,639	27,137	$2,558	6,920	1.4	3.9
Massachusetts	$4,266	82,812	$2,342	74,963	1.8	1.1
New Hampshire	$4,644	22,550	$2,784	9,572	1.7	2.4
Rhode Island	$3,907	17,730	$1,736	15,889	2.3	1.1
Vermont	$6,538	13,924	$2,516	4,635	2.6	3.0
Idaho	$1,973	34,240	$1,045	7,537	1.9	4.5
Illinois	$3,525	142,015	$1,290	337,716	2.7	0.4
Indiana	$3,200	152,753	$2,331	40,611	1.4	3.8
Iowa	$2,655	50,299	$1,840	56,555	1.4	0.9
Kansas	$2,223	66,697	$1,244	73,679	1.8	0.9
Michigan	$3,986	194,199	$1,578	203,394	2.5	1.0
Minnesota	$3,539	98,052	$2,219	100,061	1.6	1.0
Missouri	$3,230	97,338	$1,283	72,122	2.5	1.3
Nebraska	$2,269	45,828	$1,224	37,518	1.9	1.2
North Dakota	$2,381	25,312	$1,783	8,414	1.3	3.0
South Dakota	$2,727	25,451	$3,430	209	0.8	121.8
Wisconsin	$2,747	116,709	$1,942	106,578	1.4	1.1
Arkansas	$2,255	53,395	$941	24,258	2.4	2.2
Colorado	$2,562	102,265	$1,403	77,696	1.8	1.3
Louisiana	$2,230	124,397	$1,054	26,953	2.1	4.6
Montana	$2,488	27,997	$1,600	6,023	1.6	4.6
Nevada	$1,814	23,729	$1,002	35,852	1.8	0.7
New Mexico	$2,016	37,136	$689	47,401	2.9	0.8
Oklahoma	$1,936	74,962	$1,262	62,639	1.5	1.2
Texas	$2,022	325,072	$788	419,420	2.6	0.8
Utah	$2,010	71,104	$1,392	30,472	1.4	2.3
Alaska	$2,552	26,066	$1,850	812	1.4	32.1
Arizona	$2,009	75,296	$941	152,812	2.1	0.5
California	$2,731	387,529	$371	1,073,999	7.4	0.4
Hawaii	$2,298	16,798	$789	26,853	2.9	0.6
Oregon	$3,407	49,488	$1,524	80,561	2.2	0.6
Washington	$2,928	71,362	$1,445	160,555	2.0	0.4
U.S.	$2,986	4,626,228	$1,283	5,277,398	2.3	0.9

Note: Enrollment figures are for Fall 1995. Tuition figures are for the 1996-97 academic year.
Source: Tables 198 and 313 of Digest of Education Statistics 1996-97

D. Estimates of the Internal Rate of Return

Table V.D.1 contains estimates of the internal rate of return to a college degree. These estimates are for a typical 18-year-old, married, male high school graduate who works 40 hours per week and 52 weeks each year. Returns for whites and blacks were computed separately. College costs for South Carolina were computed as the enrollment share-weighted sum of 1997-98 costs at each institution. Data on costs for North Carolina, Georgia, and the nation were taken from *Digest of Education Statistics*.[1] Because the tuition and cost data were for 1996-97 or 1997-98 and the earnings data were from 1990, the data were adjusted using the consumer price index.[2] I assumed that the (1997-98) cost of books was $600.

Table V.D.I contains estimates of both private and social rates of return. The private rate of return is the rate of return as calculated by an individual student, in which case the State's subsidy (appropriation) is not included as a component of the cost. The social rate of return, on the other hand, does not depend on who bears the costs; in these computations, the State's share of costs is included as well.

1. The Private Return to a Two-Year College Degree

The first column of Table V.D.1 contains estimates of the financial return to a two-year college degree relative to a high school degree. The private return for whites was 10.1 percent in South Carolina. The rate of return to a two-year degree was slightly higher in North Carolina (11.3 percent) Georgia (11.4 percent), and the U.S. as a whole (10.8 percent).

Blacks tended to earn less than whites at all education levels, in all states, and in the nation as a whole. Despite this fact the rate of return to a two-year degree in South Carolina for blacks, 10.6 percent, was higher than that of whites. This was also true for the nation as a whole: the rate of return to a two-year degree nationwide was 13.5 percent for blacks, compared to 10.8 percent for whites. This was not the case in North Carolina or Georgia, with rates of return of 10.4 and 11.3 percent respectively.

[1] Specifically, the data were for 1996-97 from Table 313 of the 1997 issue.

[2] I assumed that college earnings increase at the same rate as do prices for goods and services as a whole. This allows for the fact that prices for education have increased faster than for goods and services as a whole.

Table V.D.1: Estimated Internal Rates of Return to College Degree

	Two-Year College Relative to HS Degree	Four-Year College Relative to HS Degree	Four Year College Relative to Two-Year College
A. Private Rates of Return			
1. Whites			
South Carolina	10.1%	10.8%	11.2%
North Carolina	11.3%	12.4%	13.4%
Georgia	11.4%	12.5%	13.5%
U.S.	10.8%	12.3%	13.5%
2. Blacks			
South Carolina	10.6%	11.6%	12.3%
North Carolina	10.4%	12.3%	13.9%
Georgia	11.3%	12.8%	14.2%
U.S.	13.5%	12.7%	12.0%
B. Private Rates of Return For Recipients of LIFE and HOPE Scholarships			
1. Whites			
South Carolina LIFE Scholarship	10.5%	11.5%	12.1%
Georgia HOPE Scholarship	11.9%	13.4%	15.0%
2. Blacks			
South Carolina LIFE Scholarship	11.1%	12.4%	13.4%
Georgia HOPE Scholarship	11.9%	13.9%	16.0%
C. Social (Inclusive of State Share of Costs) Rates of Return: South Carolina Only			
Whites	9.0%	9.4%	9.8%
Blacks	9.2%	10.0%	10.4%

Source: Calculations of the author.

2. The Private Return to a Four-Year College Degree

The second column of Table V.D.1 contains estimates of the returns to a four-year college degree relative to a high school degree. The return in South Carolina of 10.8 percent was higher than the return to a two-year degree, but lower than the 12.4 percent return in North Carolina, the 12.5 percent return in Georgia, and the 12.3 percent return in the nation. Again, despite the fact that black four-year college graduates earned less than their white counterparts, the rate of return was 11.6 percent, or 0.8 percentage points higher than that of whites, in South Carolina. The rate of return was also slightly higher for blacks in Georgia (12.8 versus 12.5 percent for whites) and the nation (12.7 versus 12.3 percent), and virtually the same in North Carolina (12.3 percent for blacks, 12.4 percent for whites).

The financial return to a four-year college degree relative to a two-year degree, shown in the third column of Table V.D.1, was nearly always higher than the return to either college degree relative to high school. For example, the returns in South Carolina were 11.2 percent for whites and 12.3 percent for blacks, 0.4 and 0.7 percentage points higher than the four-year returns relative to high school, and 1.1 and 1.7 percentage points higher than the two-year returns relative to high school. The returns in North Carolina, Georgia, and the nation ranged from 13.4 to 13.5 percent for whites, and from 12 to 14.2 percent for blacks.

3. Effects of LIFE and HOPE Scholarships on the Private Rate of Return

Students in South Carolina who qualify for the LIFE scholarship may receive up to $1,000 per year towards the tuition of a two-year institution, and up to $2,000 per year towards the tuition of a four-year institution. This program raises the private return to a two-year college degree from 10.1 to 10.5 percent for whites, and from 10.6 to 11.1 percent for blacks. The private four-year return increases by even more, rising from 10.8 to11.5 percent for whites, and from 11.6 to 12.4 percent for blacks.

Students in Georgia who qualify for the HOPE scholarship may attend any public university free of tuition. This program raises the estimated rate of return to a two-year degree from 11.4 to 11.9 percent for whites, and from 11.3 to 11.9 percent for blacks. As in South Carolina, the effect on the four-year return is higher still, raising the returns from 12.5 to 13.4 percent for whites, and from 12.8 to 13.9 percent for blacks.

The estimated effects of the HOPE and LIFE scholarship programs seem small. Suppose, however, that we were to take $10,000 – think of this as a rough (under) estimate of the opportunity cost of a year of college – and put it in the bank for 50 years. At an interest rate of 10.1 percent – the private rate of return to a two-year degree in South Carolina for whites – we would accumulate $614,327. If the interest rate were 10.5 percent – the rate of return with the LIFE scholarship – we would have $736,349, or more than $100,000 more. At an interest rate of 10.8 percent — the rate of return to a college degree for whites in South Carolina — we would accumulate $843,253 in 50

years. At an interest rate of 11.5 percent – the return to a college degree with the LIFE scholarship — we would have $1,155,349. Small differences in the rate of return make a big difference over a lifetime of wealth accumulation.

4. The Social Rate of Return to College

The social rate of return to a college degree is adjusted for all college costs regardless of who pays them, whether in the form of tuition and fees, scholarships, or state subsidies. Table V.B.1 showed that South Carolina appropriated between $3,561 and $5,627 per four-year college student (excluding Medical University) and between $3,255 and $5,580 per two-year student. Part C of Table V.D.1 shows the effect of including the State's appropriation in college costs for South Carolina. In the case of whites, the social return to a two-year college degree is 9.0 percent, compared to a private return of 10.1 percent; for blacks, the social return is 9.2 percent, compared to a private return of 10.6 percent. For a four-year degree, the social return for whites is 9.4 percent, compared to a private return of 10.8 percent, and the social return for blacks is 10.0 percent, compared to a private return of 11.6 percent. Although lower than the private returns, the social returns are markedly higher than those on alternative investments.

5. The Returns to College in Perspective

To put these estimated returns into perspective, the nominal interest rate on long-term U.S. government bonds is on the order of 6 percent. Corrected for an inflation rate of 1-2 percent, the real return is about 4-5 percent. The return to a college education is therefore about twice that on long-term government bonds. The real return on stocks over long periods of time is on the order of 7 percent; the return to a college degree is therefore about 40 percent higher than the returns to stocks. Moreover, the recent volatility in the stock market demonstrates that stocks are a risky investment, far more risky than a college degree.

The high rate of return to a college education, combined with the lower volatility of that return, helps explain why politicians in South Carolina as well as in the U.S. as a whole have focused so strongly on education. The high rates of return cause larger numbers of students to demand a college education. Both the private and public sector has responded by increasing the number of teachers, colleges, and scholarships. For more than a decade, the demand for skill has increased more quickly than the supply, the result being that the college wage premium relative to a high school degree has remained high. How long this will persist is an important topic for future research.

6. Why Are the Returns to College Lower in South Carolina?

The returns to both two-year and four-year college degrees are markedly lower in South Carolina than in North Carolina, Georgia, or the U.S. as a whole. There are a variety of possible explanations. One possibility is that South Carolinian graduates are less able than elsewhere. Another possibility is that South Carolina offers relatively fewer market opportunities for college

graduates. South Carolina's cities tend to be smaller, and its manufacturing base larger, than North Carolina with Charlotte and its Research Triangle, and Georgia with the city of Atlanta. A lack of appropriate job opportunities could manifest itself as a mismatch between the skills of college graduates and the jobs they hold. If this were the case in South Carolina, one would expect relatively large numbers of college graduates to be working in jobs that do not pay high rewards for a college degree. In the next section of this Report I examine this possibility in detail.

VI. Do Too Many College Graduates Work in Jobs that Don't Reward Their Degree?

In the previous section, we saw that the rate of return to college in South Carolina, although attractive relative to alternative investments, was somewhat lower than in North Carolina, Georgia, or the U.S. as a whole. Some might interpret this as an indication that South Carolina produces too many college graduates. The Appendix to this Report shows that within an industry, South Carolina employs fewer four-year college graduates per worker than in North Carolina or the nation as a whole. Some might argue that limited opportunities for college graduates in South Carolina drive them into jobs that do not reward a college degree. In this section, I examine this proposition in detail.

I develop two simple empirical tests of whether the labor market for college graduates functions well in South Carolina. On the demand side, we expect employers to hire more college graduates in occupations in which the degree is more valuable. On the supply side, we expect college graduates to choose occupations that, on average, reward their degree more highly. I focus here on four-year college graduates; tests for two-year college graduates are conducted in Section C. I consider the demand side first.

A. Testing the Demand-Side: Do Employers Hire More College Graduates in Occupations Where Education is Most Productive?

In some occupations education should have little affect on productivity. For example, a college education may help truck drivers learn more quickly to drive, drive more safely, or better load cargo, but the tasks involved are relatively simple. By contrast, in occupations such as engineering or human resource management, the effect of education on productivity should be much greater because they involve tasks that require relatively high levels of analytic capacity. Higher levels of human capital enable a manager, for example, to oversee a larger workforce and a broader range of functions. Better-educated managers should also be able to assign workers appropriately to the tasks to be carried out, better informed about new developments in their industry, and better able to communicate both with their subordinates and superiors. Thus, we expect a higher proportion of managers than truck drivers to hold a four-year college degree.

Although we can test the demand side simply by examining the proportions of workers who hold four-year college degrees and see if they conform to our intuition, a slightly more formal approach is desirable. The college wage premium in an occupation should be a good measure of the productivity of education in that occupation. This suggests the following Demand-Side Proposition:

Demand-Side Proposition: The proportion of individuals in an occupation with a college degree should be higher, the higher the returns to a college degree.

Before testing our Demand-Side Proposition, I give an overview of the data. First, I examine which occupations employ college graduates most intensively. Then I examine the occupations that had the highest college wage premiums. Finally, I put these two pieces of information together to conduct our test.

1. Which Occupations Employ Four-Year College Graduates Most Intensively?

Figure VI.A.1 graphs the employment intensity of four-year college graduates by occupation in the Carolinas and the nation for 1990. The height of each bar shows the number of four-year college graduates per 100 workers. Engineering occupations employed 47-50 four-year college graduates per 100 workers, followed by scientific occupation, with about 40-43 graduates per 100 workers.

South Carolina employed four-year college graduates less intensively in a number of occupations. This can be seen more clearly in **Figure VI.A.2**, which compares occupational four-year college graduate intensities in South Carolina and the nation. With few exceptions — notably, engineering at the high end and laborers at the low — South Carolina employed fewer four-year college graduates per worker in most occupations. **Figure VI.A.3** shows the same comparison for North Carolina. In **Figure VI.A.4,** which compares North and South Carolina, we see that South Carolina employed four-year college graduates slightly more intensively in science, engineering, laborer, and supervisory occupations, but less intensively in managerial, technical, and sales occupations.

2. Which Occupations Have the Highest Four-Year College Wage Premiums?

Figure VI.A.5 shows the wage premium of a four-year college degree, relative to a high school degree, in each occupation for the Carolinas and the U.S. as a whole in 1990. The highest returns in South Carolina were in primary and secondary education, followed by the military, higher education, engineering, technical, and managerial occupations. The lowest returns were in machinist, mechanical, and clerical occupations.

Figure VI.A.6 compares occupational four-year college wage premiums in South Carolina with those in the nation. The U.S. is graphed on the vertical axis and South Carolina on the horizontal. In occupations above the 45-degree line, the college wage premium is higher in the U.S.; in occupations below the line the premium is higher in South Carolina. The college wage premiums were higher in South Carolina in 8 occupations, but with the exception of engineering, most of these occupations employed relatively few college graduates. The college wage premiums were markedly lower in South Carolina in 11 of the 19 occupations, including the largest employer of college graduates (professional services).

This last finding is important. Recall that the four-year college wage premium and the financial return to a four-year college degree are lower in South Carolina than in North Carolina, Georgia, and the nation. One possibility was that too many college graduates in South Carolina are employed in occupations with low rewards to a college degree. The fact that the returns to a four-year college degree are lower in South Carolina *within* an occupation suggests that this is not necessarily the case. For some reason, the productivity of a college degree in South Carolina is lower *within* many occupations.

Figure VI.A.7 compares the four-year college wage premium in North and South Carolina. Here, the split is much more even; the premium was higher in 11 occupations in North Carolina and lower in 10. Moreover, points above the line are about as far away from the line as are points below it. Finally, **Figure VI.A.8** compares North Carolina and the nation. The college wage premium was higher in the U.S. in 11 occupations and lower in 10. However, as in South Carolina, most points above the line were farther away, on average, than the points below it. This helps explain why North Carolina, too, had a lower rate of return to college than the U.S. as a whole.

3. Testing the Demand-Side Proposition

According to our Demand-Side Proposition, the proportion of individuals in an occupation with a four-year college degree (the employment intensity of four-year college graduates) should be positively related to the college wage premium. Although formal statistical tests are possible, I use the simpler methodology of graphing. Specifically, I plot each occupation on a two-dimensional graph. The variable on the horizontal (x) axis is the college-high school wage premium, and the variable on the vertical (y) axis is the proportion of individuals in each occupation with a four-year college degree. According to our Demand-Side Proposition, the points should lie along a positively sloped line, that is, a line that starts in the lower left-hand corner and ends in the upper right-hand corner of the page.

The tests of this hypothesis are shown in **Figures VI.A.9, VI.A.10**, and **VI.A.11** for South Carolina, North Carolina, and the U.S. as a whole, respectively. In all cases, the points form clear, positive relationships. The lines of best fit all have strong, positive slopes, indicating that the data are consistent with the hypothesis.[1] These results are important, because they suggest that the college wage premium within an occupation is a good indicator of the productivity of education in that occupation. Moreover, the results conform to one's intuition. For example, the college wage premium was low in machinist and driver occupations, and relatively few workers in those occupations had a four-year college degree. At the other end of the scale, the college wage premium was high in engineering and scientific occupations, and relatively large numbers of workers in those occupations had four-year college degrees.

B. Testing the Supply Side: Are Four-Year College Graduates Employed in Jobs that Don't Value their Degree?

The results in the previous section show that employers indeed employ four-year college graduates more intensively in occupations in which the productivity of the degree is higher. In this section, we turn to the supply side of the equation. In particular, we examine whether four-year college graduates choose occupations in which the productivity of their degree is highest.[1] Slightly more formally stated, we have our:

Supply Side Proposition: The proportion of college graduates choosing an occupation should be higher, the higher the college wage premium.

Again, before turning to the tests, I give an overview of the data.

1. Which Occupations Employ the Most Four-Year College Graduates?

Figure **VI.B.1** shows the employment distribution of four-year college graduates across occupations in 1990 for South Carolina, North Carolina, and the nation. The height of each bar shows the percentage of four-year college graduates employed in an occupation. For example, managerial occupations employed 23- 25 percent of four-year college graduates, followed by 12-15 percent in education, 13-14 percent in sales, and 10 percent in clerical occupations. Engineering and technical occupations combined employed about 10 percent of four-year college graduates. As can be seen, the employment distributions of four-year college graduates were similar in the Carolinas and the nation. There is no evidence that four-year college graduates in South Carolina are employed disproportionately in occupations that, nationwide, are less skilled. In the next section, we turn to the tests of our Supply-Side Proposition.

[1]Why do we not expect returns to be equalized across occupations? Innate ability varies even among college graduates. Training costs for a complex occupation such as engineering will be lower for more able individuals. Thus, one may observe what appear to be "shortages" of engineers and surpluses of, say, clerical workers. In fact, the proportions choosing these occupations are determined by the innate ability of the workforce.

2. Testing our Supply-Side Proposition

Figure V.B.2 graphs the fraction of four-year college graduates employed in each occupation as a function of the college-high school wage premium. Because the line of best fit has a positive slope, the data are consistent with the hypothesis. The fit is from perfect, however. In particular, there are far more four-year college graduates employed in clerical, managerial, and sales occupations than predicted by the line of best fit, and far fewer in higher education or in the military. Hence, although the data are consistent with proposition 1, the support is not overwhelming. The results for North Carolina and the U.S., shown in **Figures V.B.2** and **V.B.3,** look similar to those for South Carolina.

The reader may have noticed that the data fit more closely in the case of Proposition 1 than Proposition 2. Why is this the case? An important implicit assumption is that, pay aside, all occupations are equally attractive. In reality, of course, some occupations – engineering and scientific occupations, for example – are more difficult to train for. This is not a problem in testing Proposition 2, which looks at proportions of individuals with a college degree *within* an occupation. To give an example, the non-wage attributes of engineering jobs that employ college graduates are more similar to those of engineering jobs that employ high school graduates, than they are to those of clerical jobs that employ college graduates

C. The Case of Two-Year College Graduates

Figure VI.C.1 shows that most two-year college graduates in South Carolina were employed in clerical, followed by managerial, medical, technical, and sales occupations. Surprisingly, manufacturing — machinists and mechanical — occupations were only the sixth and eighth largest employers. Both Carolinas employed higher fractions of two-year college graduates in machinist and mechanical occupations, and lower fractions in service occupations, than did the nation as a whole. **Figure VI.C.2** shows that medical, technical, police, and supervisory occupations employed two-year college graduates most intensively, with only minor differences between the Carolinas and the nation.

1. Demand-Side Tests, Two-Year College Graduates

According to our Demand-Side Proposition, two-year college graduates should be employed more intensively in occupations with higher wage premiums. The evidence is shown in **Figures VI.C.3-VI.C.5**. In each of the three cases, a positive relationship was observed. However, South Carolina contained several notable outliers. For example, despite sizeable returns to a two-year college degree in agriculture, only 3.4 percent of agricultural workers had a two-year degree. Although the two-year college wage premium in South Carolina was much higher than the national average in construction and service occupations, two-year college graduates were employed no more intensively.

Why does South Carolina employ so few two-year college graduates in occupations that appear to offer much higher than average returns to the degree? One explanation might be that some employers are unwilling to hire workers with a two-year degree, despite the fact that they are more productive than workers with lower levels of education. Some employers, particularly those with lower levels of education, may feel that construction jobs, for example, simply do not require a college degree, or may be intimidated at the prospect of hiring junior workers who are better educated than senior workers. Further research is clearly necessary before any conclusions may be drawn.

2. Supply-Side Tests, Two-Year College Graduates

According to our Supply-Side Proposition, the fraction of two-year college graduates choosing an occupation should be higher, the higher the two-year college wage premium. Surprisingly, the data for South Carolina, shown in **Figure VI.C.6**, are inconsistent with our Supply-Side Proposition. By contrast, the data for North Carolina, shown in **Figure VI.C.7**, and the nation, shown in **Figure VI.C.8**, are consistent with the hypothesis: the lines of best fit have positive slopes.

Again, managerial and clerical occupations were big outliers, employing more two-year college graduates than expected given their college wage premiums. However, the real puzzle is why the data for South Carolina were so inconsistent with Proposition 2. On closer examination, it can be seen that the two-year college wage premiums were markedly higher in South Carolina than in North Carolina or the nation in a number of occupations. For example, the two-year college wage premium in agriculture was 15 percentage points higher in South Carolina than in the U.S. as a whole, and the premiums for construction workers, supervisors, and drivers were 10 percentage points higher. South Carolinians do not seem to have taken advantage of these returns. Perhaps they are less well prepared for post-secondary education, less well informed about labor market opportunities, or simply have higher discount rates (see Chapter V) than in other states. Another possibility is that employers in South Carolina are reluctant to hire two-year college graduates, despite their higher productivity. This remains an important question for future research

VII. Conclusions

This report has examined the labor market for college graduates in the state of South Carolina. The investigation included extensive comparisons with North Carolina, Georgia, and the U.S. as a whole. Briefly, my findings were as follows:

• Between 1980 and 1990 the percentage of South Carolinians with a four-year college degree rose from 14.1 to 18 percent. In North Carolina, the percentage rose from 14.8 to 19.7 percent, in Georgia from 15.7 to 20.8 percent, and nationwide from 17.4 percent in 1980 to 22.9 percent.

• There were substantial educational differences between natives and in-migrants in South Carolina. For example, in 1990 nearly 28 percent of in-migrants had a four-year degree or better, compared with about 13 percent of natives. Similar differences between natives and in-migrants are found in North Carolina and Georgia.

• South Carolina is a net importer of college graduates. The net inflow was about 7.4 percent. North Carolina and Georgia were even larger importers, with net inflow rates of 20.2 and 50 percent, respectively.

• Within a given industry or occupation, South Carolina employs fewer four-year college graduates per worker than does North Carolina or the U.S. as a whole. This suggests that South Carolina may specialize in less-skilled tasks even within an industry or occupation.

• The private return to a two-year college degree in South Carolina, relative to a high school degree, is about 10.1 percent for whites and 10.6 percent for blacks. The private return to a four-year college degree is about 10.8 percent for whites and 11.6 percent for blacks. Relative to a two-year college degree, the return to a four-year college degree is even higher, at 11.2 percent for whites and 12.3 percent for blacks. These returns compare very favorably with the long-run return on alternative investments such as stocks and bonds, and present lower levels of risk than stocks.

• Even adjusted for state appropriations, the rate of return to college (the “social” return) is favorable relative to alternative investments. The social return of a two-year college degree, relative to a high school degree, was 9 percent for whites and 9.2 percent for blacks. The social return of a four-year college degree, relative to a high school degree, was 9.4 percent for whites and 10.0 percent for blacks.

• Although favorable relative to alternative investments, the rates of return to college in South Carolina were lower than in North Carolina, Georgia, and the nation. This was true even within

many occupations. In particular, the wage premium of a four-year college degree (relative to a high school degree) was higher in South Carolina than in the nation as a whole in eight occupations, but markedly lower in eleven others, including professional services, which employs the largest share of college graduates.

• Four-year college graduates in South Carolina respond to market forces much like their counterparts in North Carolina and the nation. They tend to choose occupations that offer higher returns to educational investments. There are, however, notable exceptions. For example, four-year college graduates nationwide, including South Carolina, are particularly abundant in clerical occupations, which offer relatively modest returns on college degrees.

• The market for two-year college graduates in South Carolina seems to work less efficiently than in North Carolina and the nation as a whole. The return to two-year degrees is higher in South Carolina than nationwide in a number of occupations, including agriculture, construction, engineering, and technical occupations; these occupations, however, seem to attract too few two-year college graduates. Whether there is a problem on the supply side (students) or the demand side (employers) is an open question.

Although the research here answered a number of important questions about higher education in South Carolina, it raises even more new ones, as suggested by the summary above. One is why are the financial returns to a college degree lower in South Carolina than in the U.S. as a whole? The answer may lie in the nature of the goods and services produced in the state. There is no Charlotte or Atlanta, and no Research Triangle, which have high concentrations of research and development activities and corporate headquarters. As a result, the goods and services produced in South Carolina may be more routinized than elsewhere, reducing the productivity of a college degree in those jobs. The other important finding is that the market for two-year college graduates in South Carolina seems to operate less well than in North Carolina and the nation. This suggests that greater emphasis may need to be devoted to assisting two-year college graduates as they search for jobs, providing both them and their potential employers with better information about opportunities and earnings. In the case of both questions, more research is needed before firm conclusions can be drawn.

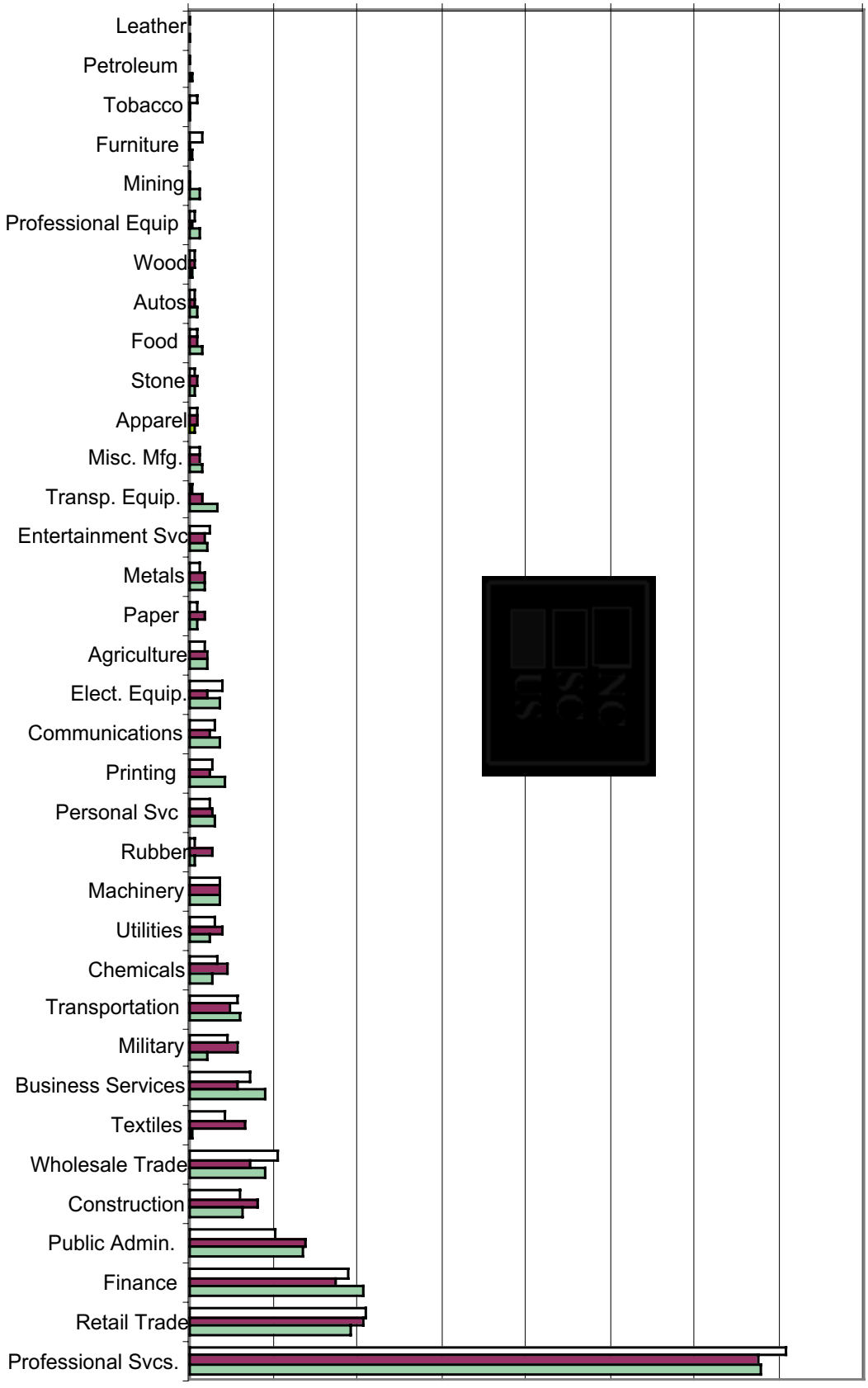
Appendix.

The Distribution of College Graduates Across Industries

Figure **A.1** shows the percentage of four-year college graduates employed in each industry in 1990 for the Carolinas and the U.S. as a whole. The distributions were similar. For example, professional service industries employed about 35 percent of college graduates in the Carolinas and in the U.S. as a whole, followed by retail trade and financial industries, each of which employed about 10 percent of college graduates.

Figure **A.2** shows the employment intensity of four-year college graduates – defined as the percentage employees in each industry with a degree — for the Carolinas and the U.S. in 1990. Professional services employed four-year college graduates most intensively, with more than 40 percent having a degree. Next was finance and public administration, with more than 25 percent of workers having a college degree. At the other end of the spectrum, less than 5 percent of the workforce had a degree in apparel, furniture, petroleum, and leather industries.

Percentage of All Four-Year College Grads Employed in Industry



Four-Year College Grads as Percent of Industry Employment

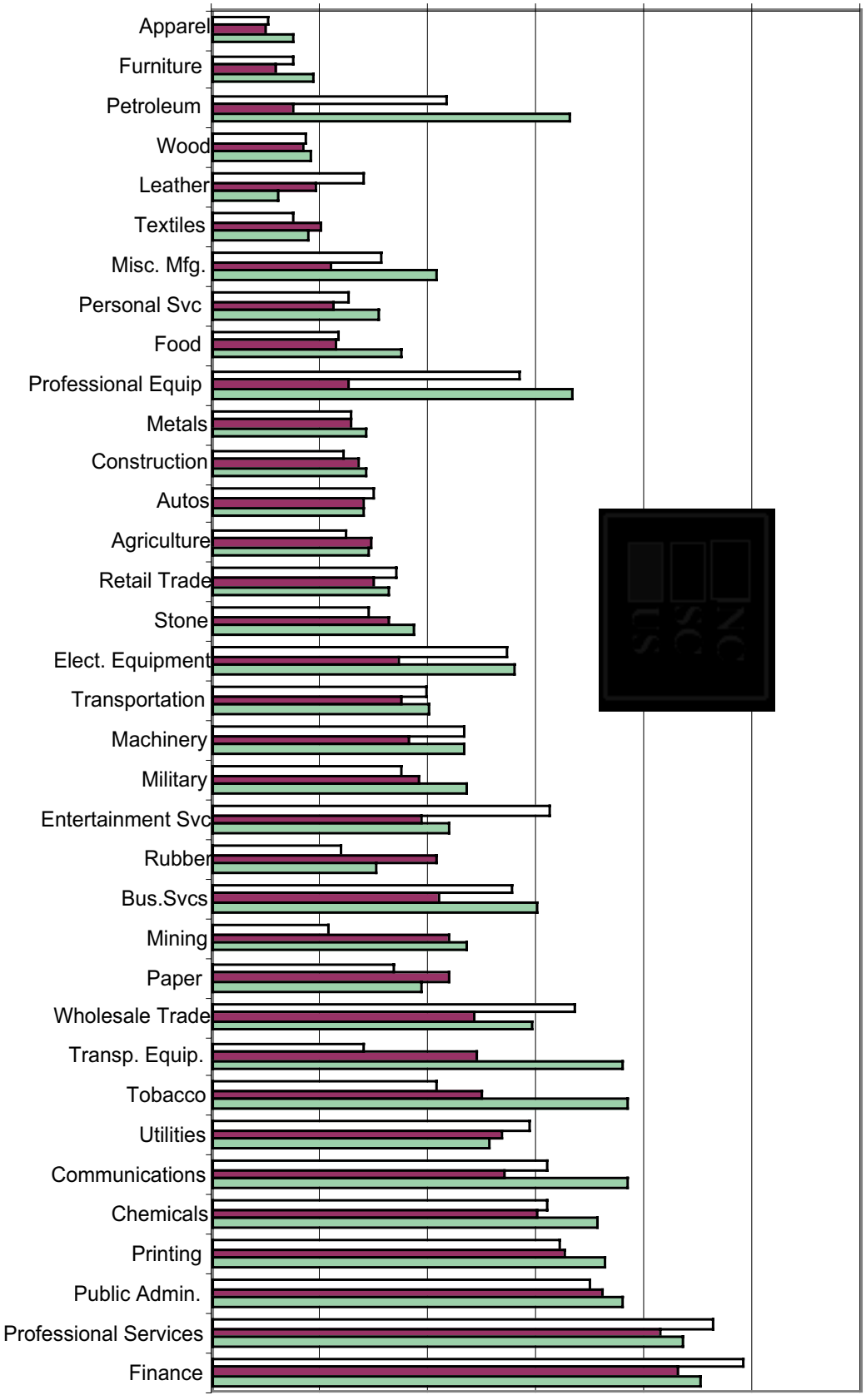
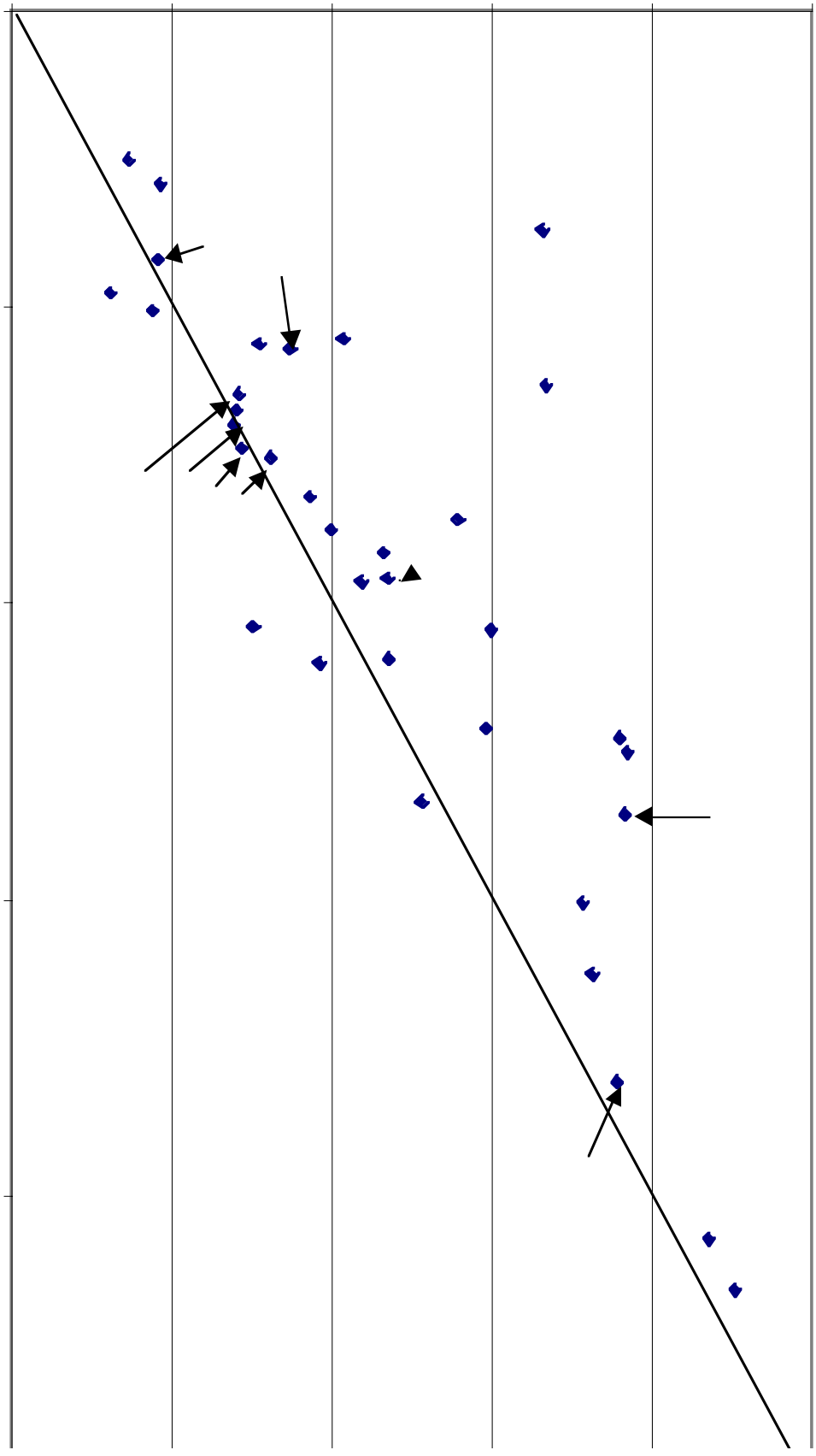


Figure A.3 compares four-year college graduate employment intensities by industry in South Carolina with those in the nation. The U.S. is graphed on the vertical axis and South Carolina on the horizontal. Along the 45-degree reference line, intensities are the same. Most points in the graph lie above the 45-degree reference line, indicating that within an industry, there are fewer four-year college graduates per worker in South Carolina than nationwide. Thus, within an industry, South Carolina seems to specialize in less complex tasks that require lower levels of skill.[1]

Figure A.4 compares four-year college graduate employment intensities by industry in North Carolina with those in the nation. Like South Carolina, most industries in North Carolina employed four-year college graduates less intensively than the nation. Finally, **Figure A.5** compares North and South Carolina. North Carolina employed four-year college graduates more intensively in 17 industries, while South Carolina employed them more intensively in only 11. Again, the data suggest that South Carolina's workforce tends to specialize in less-skilled tasks.

[1] One notable exception was the rubber industry, no doubt due to the fact that Michelin's North American headquarters is located in the Greenville metropolitan area.

United States



United States

South Carolina

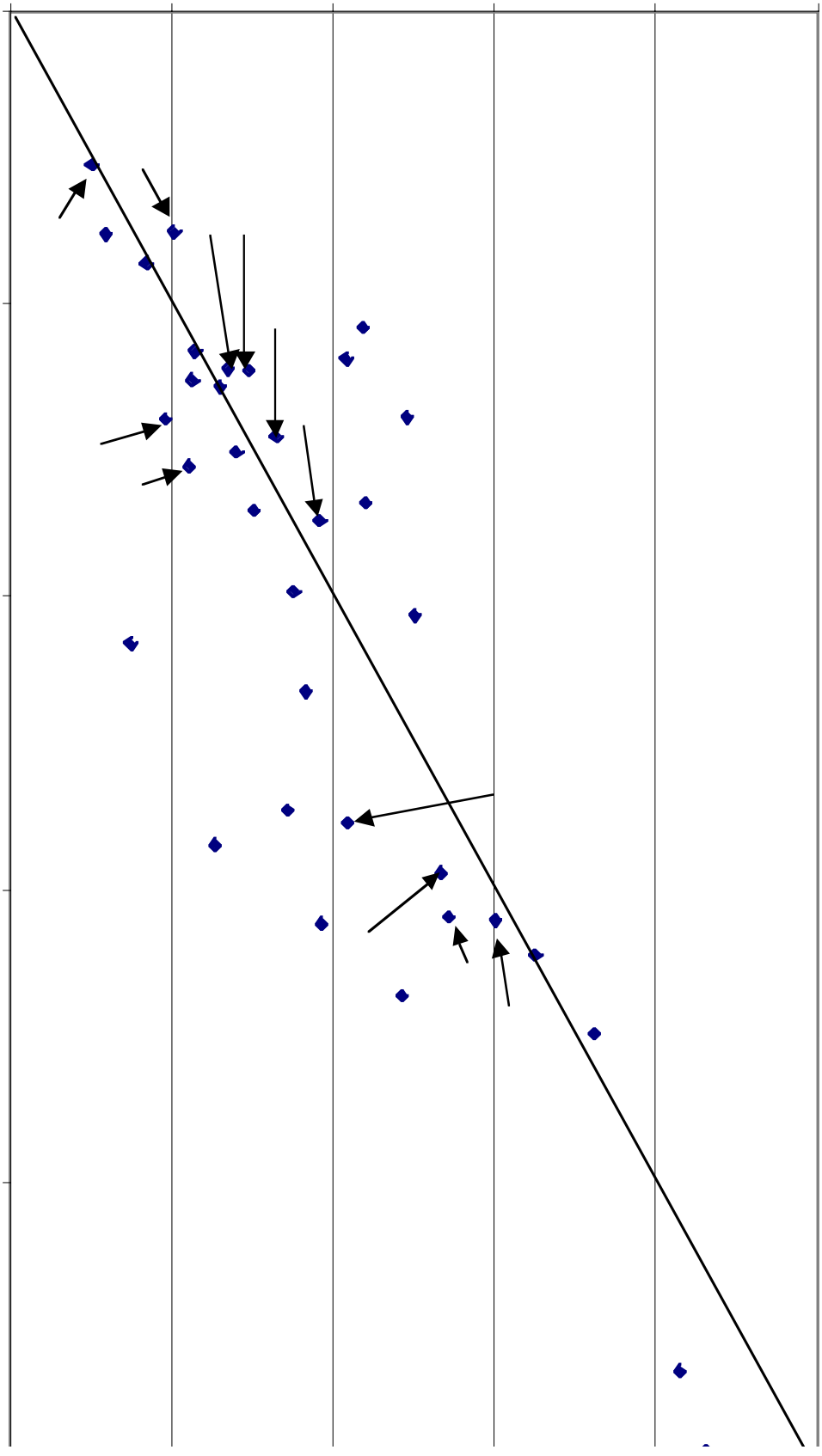
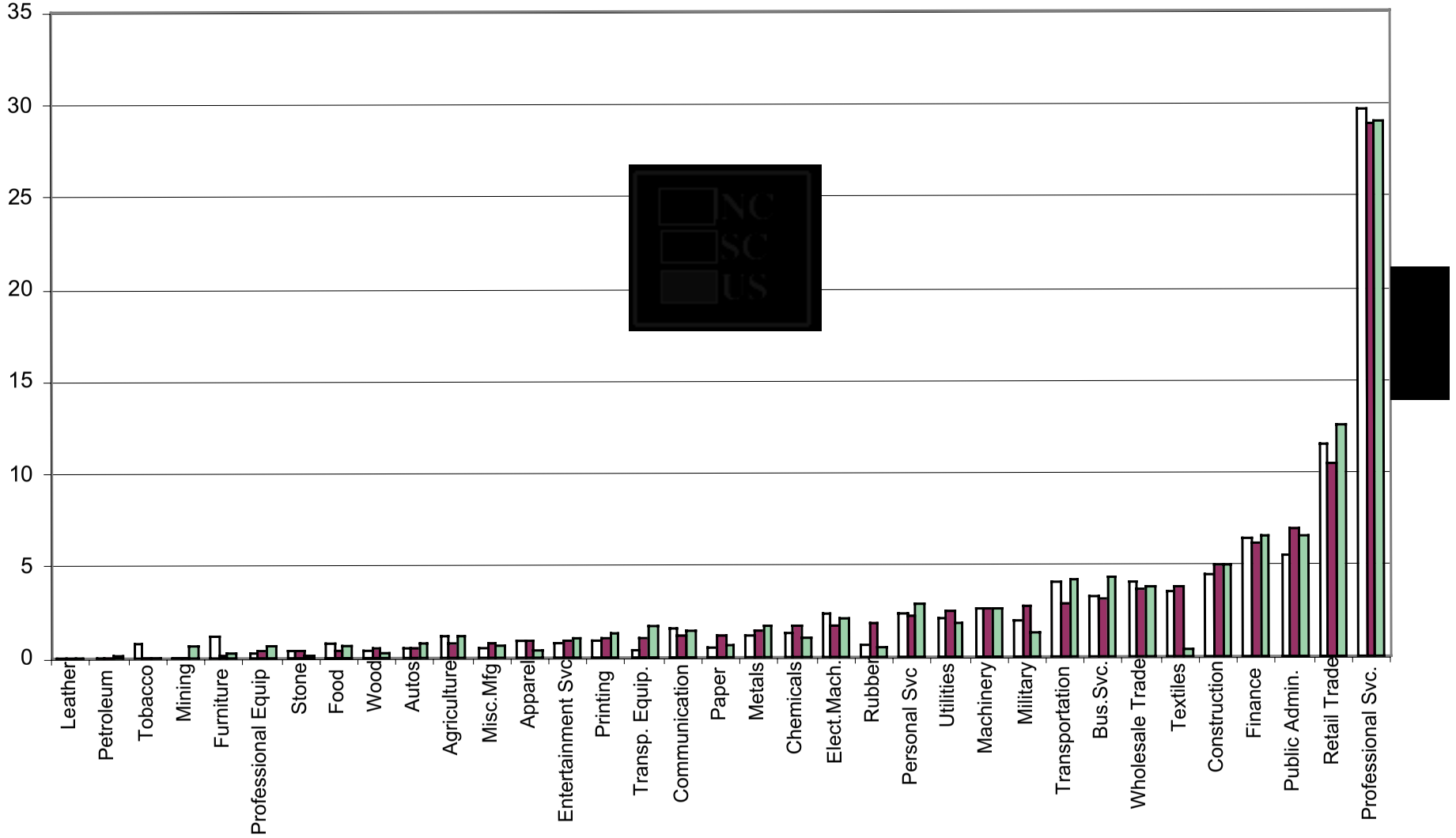


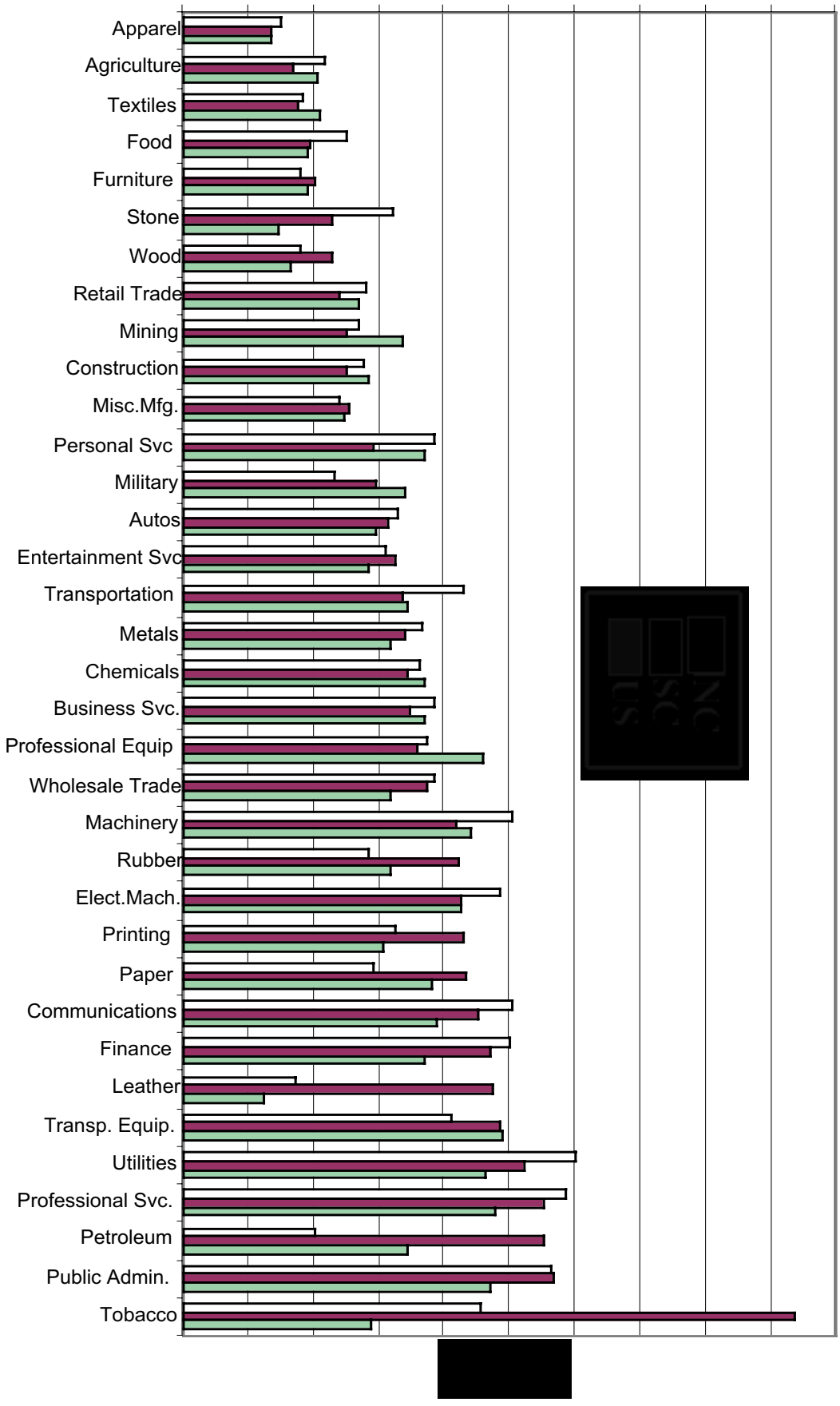
Figure A.6 shows the proportion of two-year college graduates employed across industries in the Carolinas and the U.S. in 1990. Not surprisingly, the proportions were very similar to those of four-year college graduates. More interesting is **Figure A.7**, which shows the employment intensity of two-year college graduates (that is, the percentage of the workforce composed of two-year college graduates) by industry. The pattern of intensities differed considerably from that of four-year college graduates. For example, professional services employed four-year college graduates more intensively than any other industry, but employed two-year college graduates less intensively than tobacco, public administration, and the petroleum industry.[1] The finance sector, which had the second highest four-year college graduate intensity, had the eighth highest two-year college graduate intensity.

It was somewhat surprising to discover that manufacturing industries did not employ two-year college graduates particularly intensively. Indeed, Four of the five least intensive employers of two-year college graduates were in manufacturing (apparel, agriculture, textiles, food, furniture, and stone, clay, and glass industries), employing fewer than 7 two-year college graduates per 100 workers.

Figures A.8 and **A.9** show how two-year college graduate intensities in South Carolina compared with the nation and North Carolina. South Carolina employed more two-year college graduates per worker than the U.S. as a whole in a number of industries, including tobacco, leather industries, rubber, finance, utilities, and public administration. There was a fairly even split between South and North Carolina: North Carolina led in stone, clay & glass, transportation, machinery, and utilities industries, while South

Figure A.6: Percentage of Two-Year College Graduates Employed in Each Industry: Carolinas and the U.S. 1990




Apparel
Agriculture
Textiles
Food
Furniture
Stone
Wood
Retail Trade
Mining
Construction
Misc.Mfg.
Personal Svc
Military
Autos
Entertainment Svc
Transportation
Metals
Chemicals
Business Svc.
Professional Equip
Wholesale Trade
Machinery
Rubber
Elect.Mach.
Printing
Paper
Communications
Finance
Leather
Transp. Equip.
Utilities
Professional Svc.
Petroleum
Public Admin.
Tobacco

United States

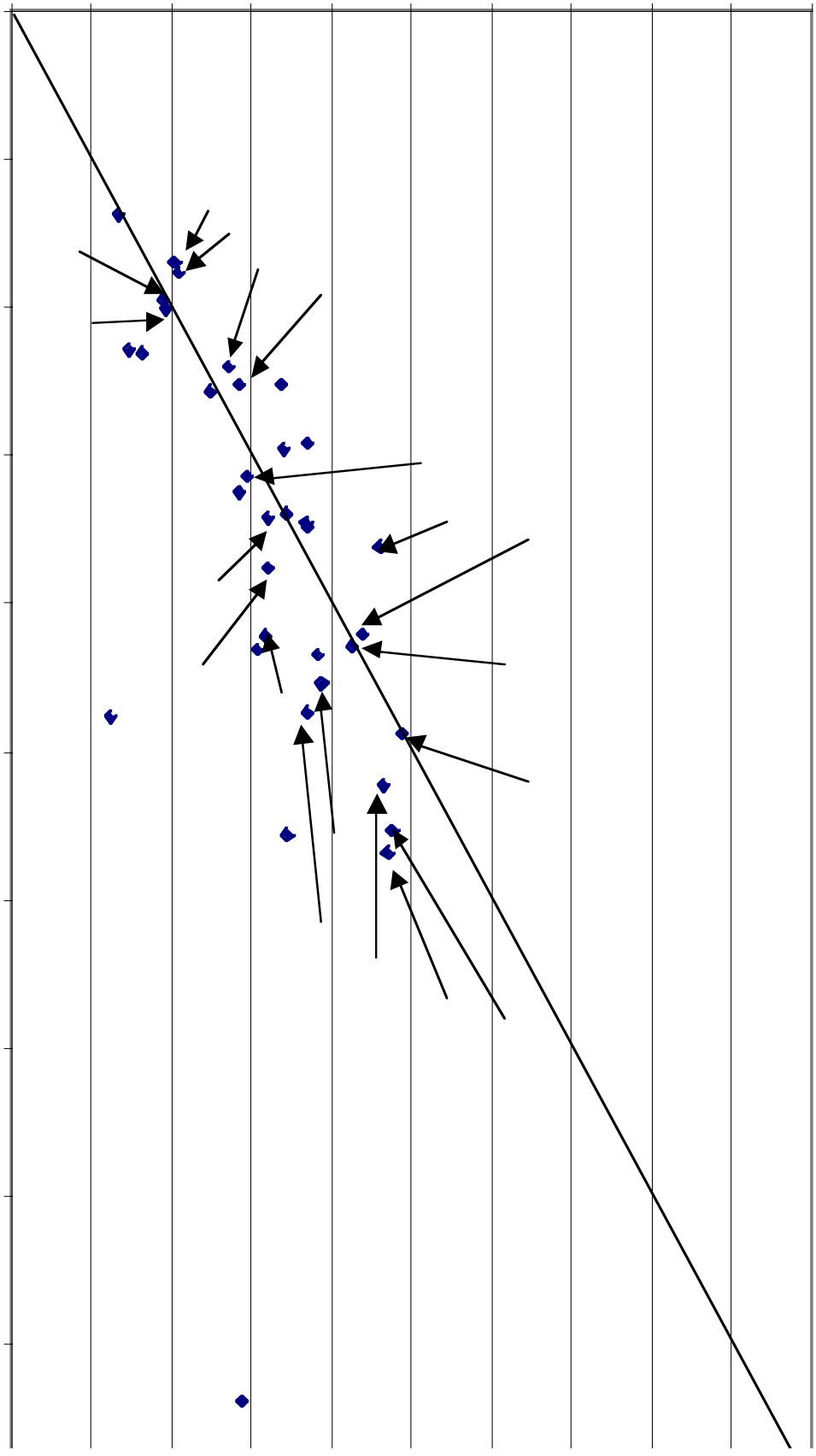


Figure A.9: Two-Year College Graduate Intensity by Industry: South vs. North Carolina, 1990